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Nearly every railway shop in the country has at one time or another developed certain handy devices for saving money or for making money by clever and original use of existing facilities or by the introduction of simple and inexpensive new facilities to accomplish some desired object. These devices are often described as "Shop Kinks," and a compilation of these "shop kinks" from all parts of the country would be of inestimable value to almost any shop foreman in the solution of his own problems. The *Railroad Age Gazette* has therefore decided to offer a prize of \$50 for the best collection of "shop kinks," such collection to consist of not less than three or more than five handy devices, with which the contributor has had personal experience. For the second best collection of "shop kinks" a prize of \$25 will be given, and all "shop kinks" sent in for the competition, if judged worthy of publication, but not of a prize, will be paid for at our regular space rates. These handy devices may be illustrated or not, just as the author pleases. They must be in our hands not later than September 25, and the winning collection will be published in our issue of October 1. Each contributor can send in as many collections of devices as he wishes in competition. For the previous presentation of similar matter we refer our readers to the paper entitled, "Useful Devices at the Silvis Shops of the

Rock Island," published January 15, 1909, page 114, and to the article on shop notes at Topeka, published January 22, 1909, page 169; also to the shop notes from the Decatur car shops of the Wabash, published on page 1256, October 30, 1908.

The study of the conditions affecting train resistance has brought forth a considerable amount of extremely able discussion by such writers as Wellington, Aspinall, Barbiers, Carus-Wilson and many other students of railway economics. Furthermore, we suppose that every important railway in the world makes its own application of the well determined facts, tempered by arbitrary variants for its own special conditions. But the masters who have written have been far apart, both in time and in linear distance, and the local engine ratings of different companies have contained much practical theory not fully elucidated. So we have asked Mr. Cole, consulting engineer of the American Locomotive Company, to view for us the mass of theory which has been gathered together; to compare and co-ordinate the work of the theorists, and to supplement this with notes from actual practice as at present found on American roads. Mr. Cole has done his work in an exceedingly thorough and painstaking manner, and in presenting the first instalment of it, this week, we believe we are setting forth the most complete and important study of train resistance which has ever been published.

ROLLING STOCK ORDERS.

The last summary of car surpluses and shortages showed a surplus of 200,000 cars, and Arthur Hale, in calling attention to the figures, said that at the present rate of decrease in surplus cars we should face a severe car shortage before October. Although the great demand for cars will be for handling the grain crop, there are signs that all classes of cars will be badly needed. The heavy coal movement should begin about September, and there is now a lot of lumber moving. In Louisiana, for example, roads are hurrying repairs for cars to carry cypress, of which heavy shipments are expected.

We have recorded since the first of June orders for about 47,000 freight and passenger cars. In the whole calendar year 1908 our records showed orders for only 64,000 cars. Since June 1 orders for 400 locomotives have been reported, which compares with orders for 1,200 during 1908. Nearly all this equipment will be delivered in time to be a factor in moving traffic this fall. The extent to which it will help the car shortage situation is largely offset, however, by the fact that much of it will, so to speak, have to carry itself. The steel and lumber for this equipment has got to be carried from somewhere before it is built. At present inquiries are out for about 200 locomotives and 12,000 cars. Orders for many of these will be placed and material for them will be shipped within the next month. It is also known that a number of roads, particularly in the West, are beginning to figure on even larger additions to their equipment than they have recently ordered, and much of this may materialize this fall.

It is reasonable to believe that the 200,000 surplus cars mentioned above do not represent carrying capacity proportionate to the cars that are now carrying freight. Probably a larger proportion of them are old small-capacity cars than those which are being used. For the last year or two, railways have been refusing to haul light wooden cars in trains in which there were heavy steel cars. Another thing which has kept light cars out of service has been the number of cars reported in shops; presumably these cars are the old light ones. The normal percentage of cars in shops is about 5 per cent. Beginning with January, 1908, the reports showed the extent to which roads were taking advantage of light traffic to put through the shops the cars which had seen such hard service in the rush times of 1907. The percentage in shop increased steadily until July, 1908, when it was 10.18 per

cent. It then began to fall off and by February, 1909, the date of the last detailed report published, it was 7 per cent.; it is probably about 6 per cent. now. Old cars which did not go through the shops, and which have been standing idle, are probably of no particular use as they stand.

New business may come too quickly. It is only a few months ago that money became available for extensions to plants, and these are not yet finished. The steel industry is already showing the effect of the volume of orders for structural material. Plants are running well up toward their capacity but are one or two months behind in deliveries and are having trouble getting enough cars.

CHICAGO GREAT WESTERN.

The sale at auction to representatives of J. P. Morgan & Co., of the Chicago Great Western Railway's property for \$12,000,000, is the final step preparatory to turning over the property to a new Chicago Great Western Railroad Co., under the plan of reorganization published some time ago in these columns. The plan, in brief, is to have the new company issue at once \$18,500,000 first mortgage 50-year 4 per cent. bonds, \$41,021,402 4 per cent. preferred stock, non-cumulative, till June 30, 1914, and after that date cumulative at the rate of 4 per cent., and \$45,245,613 common stock. The new company will raise \$24,892,274 cash by selling all of the bonds and part of the preferred and common stock to a syndicate, headed by J. P. Morgan & Co. This syndicate will keep the bonds itself, sell its \$10,136,604 preferred stock at par to holders of the old preferred B stock and the old common stock and exchange its \$31,641,333 new common for old preferred B and common. This sale is in fact an assessment of \$15 per share on both the old preferred B and the old common, for which holders are to receive 15 per cent. in new preferred stock, and in addition, in the case of the preferred B, 60 per cent. of their holdings of old stock in new common stock, and in the case of the common stock holders 40 per cent. of their holdings of old stock in new common stock. When all of these assessments are paid the company will have approximately \$10,000,000 to spend for additions to rolling stock and improvements to property, after having paid the outstanding floating indebtedness and receivership expenses, which amount to about \$15,000,000, and the syndicate will have acquired, if all the assessments are paid, \$18,500,000 first mortgage 4 per cent. bonds for \$14,755,670. In addition to getting these first mortgage bonds at 79.76, the syndicate is to receive \$500,000 for their services in the reorganization. The rearrangement of capital is a drastic cutting down of the amount of outstanding stock, which is reduced from about \$107,000,000 to a little over \$86,000,000 and a heavy assessment of old stockholders to raise the very large sum judged to be necessary to put the property in condition so that the new company may successfully compete against its powerful neighbors. The company operates 840 miles, its main line extending from Chicago to Oelwein, Iowa, from which point there run three lines, one north to St. Paul and Minneapolis, one west to Omaha, and one southwest to Kansas City. It competes therefore directly with such roads as the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul and the Chicago & North Western. The wisdom of raising sufficient cash to put a road running through such territory as this in first class shape is quite apparent, and if anything further were needed to make this absolutely convincing, the history of the old company, whose affairs are now to be wound up, provides the example. The Chicago Great Western Railway was organized in 1892, to take over the property of the Chicago, St. Paul & Kansas City. No bonds were issued by the new company, but liberal amounts of stock were issued in exchange for the bonds and stock of the old company and an assessment of about \$1,987,460 was made on the income bond holders and common stock holders of the St. Paul road, but this assessment was not compulsory, nor was it underwritten, and the company issued a statement in

1894 saying that only about \$1,300,000 was realized from assessments, and that debenture stock, which they had expected to sell, remained unsold, so that a floating debt, amounting to something over \$1,000,000 had been created, and total requirements were at that time \$2,578,000. They then made an offer to debenture and preferred A stock holders, which resulted in the company receiving subscriptions for about \$2,000,000 4 per cent. debenture stock, the subscription price being 80. This gave the company \$1,550,000 cash, but as subsequent events have proved, although a large earner per mile, it never had enough cash to make the improvements in roadbed and additions to rolling stock that were necessary. Although the immediate cause of the present receivership was the falling due of short term notes and other bills at a time when money was particularly hard to obtain under any circumstances, the underlying cause of the non-success of the old company appears to be that in the original reorganization there was not provided enough working capital and sums for improvements. This mistake quite certainly has not been made in the present reorganization. It looks as if the reorganization syndicate were getting a very good bond for a low price and that the debenture B and common stock holders were hit extremely hard, but whatever may be the individual hardships which the reorganization committee have imposed on present stockholders, the plan itself from the point of view of the company is to be commended.

THE MISSOURI RIVER RATE DECISION.

A permanent injunction was granted by the United States Circuit Court at Chicago on August 24 restraining the Interstate Commerce Commission from making the reductions in through rates to Missouri River points that were ordered in the so-called Missouri River Jobbers' case. On June 24, 1908, in the case of Burnham, Hanna, Munger, *et al.*, v. the Chicago, Rock Island & Pacific, *et al.*, *I. C. C. Rep.* 299, the Interstate Commerce Commission held that through class rates from the Atlantic seaboard to points on the Missouri River were too high and ordered a reduction of the first-class rate from \$1.47 per 100 lbs. to \$1.38, and other class rate reductions proportionately. The case was originally a complaint made by the Missouri River cities, and the jobbers at St. Louis in particular, against a higher rate from the Atlantic seaboard to Minneapolis and St. Paul, and, incidentally, they also claimed that the rate from the Atlantic seaboard to the Missouri River was too high in itself.

The Interstate Commerce Commission recognized at once that the rate to Minneapolis and St. Paul was controlled by water competition and was properly lower than to Missouri River points. The question of the reasonableness in itself of the through rate to Missouri River points was then taken up. This rate is arrived at by adding the rate from the Atlantic seaboard to the Mississippi River, which is 87 cents on first class, and the rate from the Mississippi to the Missouri, which is 60 cents on first class, making a total of \$1.47. This basing point system of making rates dates back almost as far as the history of railway rates in this country, and was the result of both competition and rate wars, and of the topography of the United States.

The severe rate wars between railways running from the Atlantic seaboard to Chicago points east of the Mississippi were finally brought to an end by the adoption of a percentage system of rates, which gave each city west of the Mississippi in territory affected by this competition a fixed percentage of the New York-Chicago rate. This system worked all right except for Mississippi River crossings. It was found that regardless of what proportion the distance to these Mississippi River crossings bore to the short line distance from New York to Chicago, they were direct competitors for trade west of the Mississippi and it was therefore necessary to give them all the same proportion of the New York-Chicago rate. This proportion was fixed at 116 per cent. There were no two great

cities west of the Mississippi like New York and Chicago on which it was possible to determine percentage rates for other cities. Competition and rate wars, however, forced some plan of rate making, and it was at last found most expedient to give all cities on the Missouri River the same rate from any point on the Mississippi River.

In other words, goods can move from Atlantic seaboard points through any city on the Mississippi to any city on the Missouri at the same rate at which goods can move by the shortest route from the Atlantic seaboard direct to the nearest city on the Missouri River. Moreover, the jobber at a Mississippi River city can buy goods in New York, ship them to his own city and then reship them to a point on the Missouri River at just the same cost for freight as a dealer at a city on the Missouri River can buy goods in New York and ship them direct to his city. This gave the jobber at Mississippi River points the opportunity of competing with the jobber at Missouri River points in the Missouri River jobbers' own city and in all territory west of the Missouri River. It also gave the Mississippi River man the chance to sell goods cheaper in the territory between the Mississippi and the Missouri rivers than could the Missouri River man. To a certain extent this appears to be an arbitrary parceling out of territory to dealers made by the railways, but *any* rate predetermines the chance of a city to compete with some other city, and since it is necessary to have arbitrary rates the arrangement between the Atlantic seaboard, the Mississippi River and the Missouri River seems to be most logical and most natural.

The Interstate Commerce Commission did not meet the question brought up in the Munger case quite squarely. While claiming in the opinion written by Commissioner Clark that it did not disapprove of the basing point system of making rates, it ordered a different system of rate making in the most important instance where the basing point method is used. It should be remembered that the commission in so many words did not fix a through rate from the Atlantic seaboard to Missouri River points, but reduced the existing rate which applied between the Mississippi River and the Missouri River on *through* traffic. Of course, in effect this actually fixed a through rate from the Atlantic seaboard to the Missouri River, which was less than the combination of the through rate from the Atlantic seaboard to the Mississippi, plus the local rate from the Mississippi to the Missouri. This opened wide the door to any city west of the Missouri River to ask for a lower through rate from the Atlantic than the through rate from the Atlantic seaboard to the Missouri River, plus the local rate to the western city. Denver was typical of the western cities, and jobbers at this point were quick to bring a complaint based on exactly the same principles that had governed in the Missouri River rate case. The commission, to be consistent, had to grant their petition, and this case is also now being reviewed by the courts.

The Circuit Court, in its opinion, an abstract of which appears elsewhere, shows clearly that it fully understands how much beyond the mere fixing of an individual rate the commission went in the Munger case and what great powers it was assuming. The court decision is a judicial pronouncement of principles which have been pointed out and discussed in these columns many times before. The commission was not intended to usurp the rate-making functions of the railways. It was not intended to be a grand freight traffic manager appointed by the President of the United States for all the railways in the country, and yet that is exactly the view of itself that the commission at times seems to take, and probably will continue to take, at least until it has appealed the present case to the Supreme Court.

THE LOCOMOTIVE ASHPAN SITUATION.

It has been enacted by those who have the safety and welfare of the railway employee at heart (to say nothing of his vote) that on and after January 1, 1910, all locomotives haul-

ing trains that are engaged in interstate traffic shall be fitted with ashpans that may be dumped and cleaned without making it necessary for any workman to go beneath the engine or between the rails. Like the provision for the periodical inspection of locomotive boilers this is a good one, though needless because, as in the case of boiler inspection the railways have long been doing all that the statute requires, so for many years most new locomotives have been fitted with self-clearing ashpans. Still, the law will do no great harm and it will show the fire cleaner, as doubtless intended, that his good friend the politician is looking after him, and will add a few more inspectors to be fed at the public crib.

From the standpoint of operation, too, the use of the self-clearing pan is good. Not only does it do away with much disagreeable and difficult work in the case of locomotives, but it lowers the cost of doing the work, and incidentally decreases the amount of dust and dirt that is scattered over the machinery at end of every run, and should, therefore, have some effect on repairs. With the promulgation of the law, of course, a cloud of inventors have arisen, ignorant of what has been done, and still more ignorant of the conditions to be met, and these voluntary helpers have brought forward all manner of contrivances to meet the demand and win the prize which some of them think the Interstate Commerce Commission has offered for the best device. Like the coupler inventors of two decades ago, these people may be disregarded, and with even more reason because of the advancement in the art.

Speaking broadly, there are two general types of ashpan in use upon American locomotives. One is the shallow flat pan used beneath the old narrow fireboxes that drop down between the frames, and are set but a short distance above the top of the rail. The other is the hopper type, in almost universal use, though in many forms, on the heavy modern locomotive.

In the adaptation of the self-clearing pan the greater difficulty has been found to lie in its application to the shallow pan, though the problem has been solved in a very simple and satisfactory manner.

That the self-clearing pan was possessed of advantages over the ordinary design is shown by the fact that it was introduced more than 25 years ago, when the narrow firebox was the standard. One of the earliest of these designs was that of the folding slat arranged in a manner similar to a window shutter, where a series of slats pivoted at their ends are connected by an operating rod and moved together. This arrangement was tried upon the Flint & Pere Marquette, also on the Illinois Central, and possibly elsewhere, but owing probably to faulty design was discarded, to be revived at a later date and made successful, for it is now in use on the Chesapeake & Ohio and in a modified form on the Chicago & Eastern Illinois.

Another and still simpler arrangement for cleaning the shallow pan is the use of the steam jet. No change is made in the construction other than the placing of a row of steam jets across one end, from which the ashes are blown out at the other. This is the method that is probably receiving the widest application and its advantages are at once apparent. It is exceedingly rapid in operation, and requires no change in the standard of pan construction that has been in vogue for a half century or more. Further, with the solid bottom the danger of dropping live coals upon track and bridges is reduced to a minimum, along with the corresponding damage by fire. It was because of the warping of slats and the scattering of coals that the early attempt to introduce the blind slat construction was abandoned.

Another modification of the shallow pan that complies with the law but is not self-clearing is obtained by the use of slides in the vertical sides of the pan. When these are opened the ashes are hoed out by hand in the good old-fashioned manner, but without requiring that the man should go beneath the engine to do the work.

In some cases the type of bottom used on the hopper pans has been adapted to the shallow pan, and with apparently satisfactory results. One instance of this kind is that of the Pennsylvania Lines West, where half doors, swung from hinges at the sides, are turned up beneath the pan. This construction necessarily requires that the bottom of the pan be a little higher above the rail than is sometimes the case, but where it is applicable it has the advantage of a uniformity of practice on all engines.

In the case of hopper pans the larger number of roads use a simple slide. This has been a standard of practice for so long a time that it is quite natural that it should persist. The old method was to put the slide in and drive it home from beneath the engine. Then, when the engine was to be cleaned, a man went beneath, drove it out and down came the contents of the hopper. It was a hot, dirty job accompanied by occasional burns that were sometimes serious. It was a simple mechanical problem to connect a row of these slides of the two or three consecutive hoppers, with rods, attach an operating lever and arrange to manipulate them from the cab or the side of the engine, and this is just what a large number of roads have done.

To those who are familiar with this old form of hopper slide it is well known that sticking is one of its characteristics. Unless it is carefully designed it has a propensity to get jammed shut and to warp and twist in a manner that frequently leads to the use of language. And then, when cold weather comes on, ice and snow will gather in its crevices in a manner that renders motion impossible without the application of the persuasive energies of a sledge hammer. It follows, from this, that if a man is not to be allowed to go beneath the engine to drive a frozen or jammed slide loose, it must be well looked after if it is to be moved by the lever commonly used or even by the air or steam cylinders that are sometimes applied. And it is to avoid this danger of sticking by freezing that a few roads have applied steam pipes to the hoppers to thaw them out.

Next to the slide in number of applications comes the flap or swinging door. It is easily operated and that with a simple mechanism which can be arranged to be worked either from the cab or from the ground beside the engine. Ashes flow out over it and, barring warping, it closes firmly against the bottom or sides of the pan. It is usually constructed to extend across the hopper and a single door is used for an opening, but sometimes double doors are used and these may open longitudinally, as in the case of the Pennsylvania Lines West.

A final form of drop is one that was introduced a number of years ago on the New York, Ontario & Western, and has given very satisfactory service. In this the door is carried on inclined hangers, through trunnions cast at the ends, while the operating rod is coupled to another set of trunnions. The movement is such that, at the start, the door drops away from the face of the hopper and then tilts up and takes a position back of it, out of the way, thus leaving the whole area of the opening free and unobstructed. It never freezes shut so that a blow from a hammer on the side of the hopper will not free it. It does not clog or jam, and little or no trouble is experienced with the warping of the plates, as they are of the simplest design.

There are, of course, many other designs in use; some quite complicated in the arrangement of the levers, but they are of limited application, and the types detailed above may be said to cover the great mass of American railway practice. There are some of these minor devices that may be ruled out as not meeting the legal requirements. For example, it will probably be conceded by most that it is the spirit, if not the letter of the law, that not only must it be possible to open the ashpan and draw the ashes, but also to close it after such emptying and put the locomotive back in running condition, without making it necessary for a man to go beneath the engine or between the rails. In some cases simple lateral

slides are used that may be easily pulled open by a man outside the track, but require that he shall get beneath the engine and lean over from 12 in. to 15 in. between the rails in order to replace them. That the arrangement complies with the letter of the law there is little doubt. What the commission will do in this and other similar cases remains to be seen, for there are evidently two points of view that may be taken: One is that of a strict literal interpretation of the law and the other that of its spirit. It is evident that the intention of the framers was to construct a statute to protect workmen from personal injury while engaged in the occupation of dumping and cleaning the ashpans of locomotive engines, and this will probably be the position taken by the commission.

To anyone familiar with mechanisms of this character it is evident that they must be of a very substantial construction, simple in design, not apt to get out of order because of the stresses or heat to which they may be subjected, and easy to manipulate, without liability to clogging either by ashes or by ice. Of all these requirements strength of construction and simplicity of design are the most easily met; but it is quite possible that, in two designs which are nearly identical, one may be very efficient and the other impracticable. Take, for example, the simple slide to close a hopper. If one has free guideways from which the ashes are easily pushed and the other has a pocket or a closed end; the first may work year in and year out without causing trouble and the other may be jammed at every operation. So in the matter of warping plates; if these are not made of suitable metal properly ribbed and stiffened the heat of the ashes will distort and cause them to bind.

As a satisfactory ashpan should not be liable to frequent failure and disablement, it should be strong, simple, easily manipulated and not subject to damage from load, handling or heat. It will be seen that so far as the general types of pans passed in review are concerned, any of them can be made to fulfil the requirements of the law. Whether all the designs that are in use will be found to be satisfactory to the railways using them and to the men inspecting them on behalf of the commission remains to be seen. The prognosis for some of them is not very favorable.

CENTRAL OF GEORGIA.

The results obtained by the operating department of the Central of Georgia in 1909 were first class. With a total revenue of \$11,200,000 in 1909, as against \$11,400,000 in 1908, there was saved for net revenue \$3,400,000 last year, as against \$2,900,000 in the previous year, and this saving was nearly all in the cost of conducting transportation. This highly creditable showing of the operating department does not, however, change the fact clearly indicated in the report for the fiscal year ended June 30, 1909, of the need of financing future improvements and providing a scheme for refunding maturing obligations.

E. H. Harriman, in a speech in Georgia a couple of years ago, laid stress on the statement that the Central of Georgia needed to be almost rebuilt in places and he pointed out that it would be necessary in the near future to spend large sums on revision of grades and curvature. The annual report fully bears Mr. Harriman out in this contention. There was, for instance, 457 miles of main track, none of it second track, laid with 56-lb. rails and 321 miles of main track laid with 63½-lb. rails. This is out of a total of 1,920 miles of main track, operated in 1909. Since Mr. Harriman's speech the road has spent something, it is true, on betterments, but these sums were necessarily comparatively small. Last year there was spent for betterments \$680,000 and about half of that amount was spent in 1908. This was from income, and last year there was spent \$240,000 on capital account, being part of the money received from the sale of \$300,000 consolidated

mortgage bonds (\$60,000 of the money so received was used for refunding purposes).

This block of bonds is the last of the consolidated mortgage bonds that were left in the treasury. In the annual report of 1908 it was pointed out that after the sale of this block of \$300,000 consolidated mortgage bonds it would be necessary to adopt some new way of raising money for capital purposes. The Central of Georgia has outstanding \$36,653,000 fixed interest bearing debt and in addition \$15,000,000 income bonds, making a total funded debt of \$51,653,000. This is at the rate of \$31,318 per mile of line owned, including the income bonds. The interest on this funded debt, excluding the income bonds, amounts to \$1,032 per mile. The company has outstanding also \$650,000 short term notes and there fall due \$30,000 semi-annually first mortgage bonds of underlying companies.

The fact that improvements will have to be made from capital account and not from income is emphasized by the position of the income bondholders. These bonds are divided into three classes: first, second and third. They were issued in 1896, and in that year 1½ per cent. was paid on the first preferred bonds and nothing on the other two classes. In 1904 the first dividend was declared on the second income bonds, amounting to 2 per cent., and at this time 5 per cent. was being paid on first incomes. In 1905 and 1906 5 per cent. was paid on all three classes, but in 1907 3.7 per cent. was paid on the seconds and nothing on the thirds, and last year nothing was paid on any of the income bonds. The bondholders formed a protective committee and brought suit to compel dividend payments, claiming that the company was spending on improvements of the property sums that should have been used to pay interest on the income bonds. They also claimed that the earnings of the Ocean Steamship Co. of Savannah, all of whose capital stock is owned by the Central of Georgia, are properly available for the interest on their bonds. In this connection and in the assertion that interest should have been paid in 1908, the auditor appointed by the Supreme Court of Georgia has recently upheld them. The steamship company paid \$300,000 in dividends to the railway company in 1909 but nothing in 1908. It is quite plain, from the attitude of these bondholders therefore, that it will be well nigh impossible for the company to make any extensive improvements from income.

The chances of raising money by the issue of some new bonds is probably rather different now that the Illinois Central has taken over the Central of Georgia than it would have been if the Georgia road had remained under the control of the Southern Railway. It was only recently that the Illinois Central formally took over the capital stock of the Georgia road, but not long after Marston J. Perry and Oakley Thorne bought the stock of the Central of Georgia from the Southern Railway in 1907. E. H. Harriman, testifying in Georgia, said that he himself in fact had acquired this stock and was holding it with a view to turning it over to the Illinois Central. It would be simple indeed for the Illinois Central to arrange some method of bond or security sale for its controlled road as compared with the difficulty the Southern Railway would probably have if it still controlled the Georgia road.

Outside of this general need for improvement and refunding, the Central of Georgia is in a rather better position as to working capital than it was a year ago. On June 30, 1909, there was \$437,000 cash in the treasury, which is about \$140,000 more than on June 30, 1908, and the total current assets were \$1,500,000, or \$203,000 greater than in 1908, while current liabilities amounted to \$1,300,900 in 1909, or \$64,000 less than in 1908.

As previously mentioned, the total operating revenue was \$11,200,000 in the fiscal year ended June 30, 1909. This is 2 per cent. less than 1908, the principal reductions in earnings being a decrease of nearly 4 per cent. in revenue from passenger train service. This revenue amounted to \$3,300,000 in 1909. Freight revenue amounted to \$7,400,000, or only 1½ per cent. less than in 1908. The number of revenue passengers carried one mile totaled 127,800,000 in 1909, being slightly greater than in 1908, but the revenue per passenger



The Central of Georgia.

Not all connecting lines are shown.

per mile was only 2.147 cents last year, as compared with 2.250 cents in the previous year. On the other hand, the number of ton-miles of revenue freight carried amounted to 688,500,000 last year, a decrease of a little over 2 per cent., while the revenue per ton per mile was 1.079 cents last year, as compared with 1.072 cents in the previous year.

Operating expenses as a whole decreased, being \$7,900,000 last year, as against \$8,500,000 in the previous year, thus the operating ratio was reduced to 70.48 per cent. in 1909, as compared with 74.84 per cent. in 1908. The whole saving was made in transportation expense and in general expenses, nearly all of it being in transportation. In 1909 \$3,400,000 was spent on this account, as compared with \$4,150,000 in 1908. This is a decrease of 17.22 per cent. The savings were made in accounts which showed a distinct increase in operating efficiency; for instance, only about half as much, namely, \$132,000 was spent in 1909 for injuries to persons as in 1908. In 1909 \$155,000 was spent for loss and damage to freight. This is less by \$75,000 than in 1908. The cost per locomotive-mile run was reduced to 27.041 cents in 1909 as compared with 29.617 cents in 1908. Freight statistics show the same increased efficiency in the operating department. The average

number of loaded freight cars per train was 17.43 last year and 15.95 in the previous year, an increase of over 9 per cent., and the average train load was 257 tons last year as against 237 tons in the previous year, an increase of over 8½ per cent.

As a whole, there was more spent on maintenance in 1909 than in 1908, and the following table compares unit costs of maintenance in the two years:

	1909.	1908.
*Maintenance of way.....	\$706	\$686
Repairs per locomotive.....	2,162	2,101
Repairs per passenger-train car.....	612	673
Repairs per freight-train car.....	66	68

*Note.—Per mile of first and second track operated, two miles of sidings and switch tracks being counted equal to one mile of first or second track.

Apparently in 1909 the effect of interchange of traffic between the Illinois Central and the Central of Georgia at Birmingham was not of enough importance to greatly help the Georgia road. The total tonnage of all classes of freight amounted to 4,555,000 tons last year as against 4,700,000 tons in 1908. The only noticeable change in the proportion of the various classes of freight is a decrease in the proportion of the tonnage of products of forests. There was 810,000 tons of products of forests carried in 1909 as against 898,000 tons in 1908. This makes the proportion of this tonnage only 17.77 per cent. of the total tonnage last year, as compared with 19.11 per cent. in the previous year.

One might make a guess that the Illinois Central does not find it expedient to use the Central of Georgia for an outlet for its freight to Savannah, preferring to wait until the needed improvements to the line and equipment are made, so that possibly the benefits that will occur to the Central of Georgia from its connection with the Illinois Central will be delayed until these improvements have been made. In the meantime a very large cotton crop is promised and this together with returning business prosperity should help greatly towards increasing gross earnings in the 1910 fiscal year.

The following table gives a comparison of the operating results of the last two years:

	1909.	1908.
Average mileage operated....	1,916	1,913
Freight revenue.....	\$7,430,497	\$7,539,612
Passenger revenue.....	3,280,530	3,399,640
Total operating revenue.....	11,155,182	11,393,013
Maint. way and structures.....	1,544,714	1,500,662
Maint. of equipment.....	2,119,689	2,104,671
Traffic.....	321,621	312,729
Conducting transportation.....	3,432,075	4,145,932
Total operating expenses.....	7,682,036	8,518,978
Taxes.....	487,827	445,829
Operating income.....	2,866,867	2,481,492
Gross corporate income.....	3,587,523	2,873,615
Net income.....	2,661	5,426*

*Loss.

NEW PUBLICATIONS.

Handbuch des Eisenbahnmaschinenwesens. Herausgegeben von Ludwig Ritter von Stockert, Professor an der k.k. Technischen Hochschule in Wien. 3 Bde. Berlin. Verlag von Julius Springer. Vol. I Fahr-
betriebsmittel (Means for Transportation), 834 pp. 650 illust.
Price, \$8. Vol. II Zugförderung (Train Operation), 856 pp., 591
illust. Price, \$8. Vol. III Werkstätten (Shops), 441 pp., 471 il-
lust., 6 lith. plates. Price, \$4. Each volume can be purchased sep-
arately.

The field covered by this publication is more extensive than its title, "Handbook of the Machinery of Railways," would seem to indicate. The conception of "machinery" is in this case to be taken in its broadest sense as applying to everything of a mechanical nature and to some extent to matters of organization and of costs germane to the construction and operation of appliances for mechanical train transportation. Thus is included not only railways proper (both steam and electric), but also their near relatives, street railways, elevated and suspended railways, subways, haulage of trains on roadbeds without tracks, and some applications of the automobile. To present this mass of detailed information and have it up-to-date is beyond the power of any one man, and only by securing the co-operation of engineers intimately familiar with the various subjects to be treated was it possible to achieve the desired end. The thoroughness with which the

many topics have been covered is an eloquent testimony to the prominent engineers who have contributed to produce this excellent work.

The subject is treated under three heads—Means for Transportation, Train Operation and Shops; one volume being devoted to each head. The plan followed in each volume is first to present a summary of the fundamental principles and general considerations of the subject and then to take up the details in the most minute and exhaustive manner, thus giving a complete and accurate account of German practice with frequent reference to that of other countries, especially to that of the United States.

Vol. I. The means of transportation are the equipped locomotives (steam and electric), motor-cars, and cars for passenger and for freight service. A general description of these is followed by a series of articles describing the manufacture of the different parts and their assembling. The fulness of detail and the careful description of manipulations and of shop methods are admirable and valuable and will be appreciated by the locomotive and car builder.

Vol. II. Train Operation. To operate trains, the permanent way being provided, there is necessary an equipment of power and of cars, means to care for the equipment when not in actual use, provisions for minor repairs, apparatus and laboratories for making tests for purposes of control, a proper organization of the labor personnel to secure efficient work and a record of costs. This is the field covered by this volume.

Vol. III. Shops. After a description of some of the most characteristic shops in Europe and in this country, the various phases of shop work are covered by the following articles: Maintenance of Equipment, Recent Shop Appliances, Shop Accounting, Damages to Locomotive Boilers, Their Cause and Remedy, Testing of Materials, Testing of Locomotives, Plants for Cleaning Cars, Provisions for Succor in Railway Accidents.

Each volume is provided with a well arranged table of contents and an excellent index.

E. F. E.

Travels from the Grandeurs of the West to the Mysteries of the East. By Charlton B. Perkins. 482 pages, 8½ x 11 in. Price, Cloth, \$3; Leather, \$5. Published by The Charlton B. Perkins Company, San Francisco, Cal.

This work is intended to supply the prospective traveler to the Orient and around the world with all the information necessary for a thorough tour of the important places reached by the steamship lines maintaining a regular service to that part of the world.

It deals with the important seacoast cities, the grand canyon of Arizona and the Hawaiian Islands, Japan, China, the Philippine Islands, Cochin China, Siam, Straits Settlements, Java, Penang, Burma, India, Ceylon, Arabia, Egypt, Naples, London and New York.

The chapters devoted to the various countries or cities are distinct in themselves, so that the book may be used as a guide for the traveler going around the world in an easterly direction as conveniently as if he had chosen to follow the westerly course adopted by the author. Besides giving enough of the history of each country to refresh the memory of the educated traveler, information is given in convenient form regarding population, conveyances, fares, currency, postage, hotels, telegraph and cable rates, location of consulates, banks, newspapers, clubs, churches and the principal places of interest and how to reach them. Ever since it has been shown that the eighty days allowed by Jules Verne for the comfortable encircling of the globe is more time than is actually required, there has been a lively desire on the part of the American traveler to seek the out-of-the-way places of the Far East, and having once reached the antipodes it is just as easy and much more enjoyable to return home by continuing in the same direction. Mr. Perkins' charming book will not only be used as a guide book pure and simple, but it will be found useful by the general reader as a source of information.

Letters to the Editor.

WHEN WE LIVED UNDER THE COMMON LAW.

Tidewater & Western Railroad Co.,
Richmond, Va., Aug. 13, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I send you herewith a verbatim copy [reprinted below] of the printed form of a secret contract between shippers and an old rail and water line (no longer in existence) which no doubt your readers will look upon as a relic of a bygone age. It may interest them for a moment, if only for the humor of the fifth section, which calls for the "honest and faithful" carrying out of a rebate agreement.

T. M. R. TALCOTT.

MEMORANDUM OF AN AGREEMENT.

ENTERED INTO THIS DAY BETWEEN.....
AGENT OF THE.....

and.....
FIRST.—We, the undersigned, do agree that this Contract shall be considered as a matter of the strictest confidence and not to be divulged either directly or indirectly, to any party or parties, under any circumstances.

SECOND.—That the existence of this obligation or oath, and the requirement of the signature and signing of same be considered as a matter of confidence and not to be divulged to any one, even after the said Contract has expired, or while in force, or whether the Contract be renewed or not, or at any time in the future.

THIRD.—All correspondence and interviews relative to the adjustment of irregularities and settlements under this Contract or agreement shall be addressed only to.....

FOURTH.—That in case the Merchant, Shipper, or Broker's goods are forwarded through or by any other line than this one, whether by error or deliberately diverting Freights or goods from this Line and contrary to instructions, this Line is not to be held responsible for the said diversion and no demands shall be made on the party or parties so directing or diverting business that will in any way implicate or tend to the exposure of this Line or Agreement.

FIFTH.—We solemnly pledge ourselves to carry out all of the above requirements honestly and faithfully, so help us God.

THE FREIGHT CLAIM DEPARTMENT.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I have read the article on this subject in your issue of June 5 and many others before that, and the more one knows about it the more fully does he sympathize with the people, both shipper and railway, who find the present condition unsatisfactory.

The average freight claim office man has had little experience outside of his office, and being human he becomes imbued with the idea that his work is of the greatest importance, and it is; he is right enough there. But he also accepts it as a fact that the losing the merchandise entrusted to the railway and then hunting for it is as much a part of the railway business as is the running of trains. It is true that it has become so, but that does not alter the fact that after all it is a sore on an otherwise fairly healthy body. It should be cured, not accepted as part of the original scheme, and its spreading viewed with Oriental fatalism.

The claim office men have many neat little forms on which they ask neat little questions of the man who has made the mistake in the first place (and is more than likely to repeat it in his answer). Then having started wrong they ask the same or similar questions of many others. Failing to arrive anywhere, as the blind do when led by the blind, the hunt is given up and the railway loses the value of the goods and often the friendship of their owner.

Like most other railway offices the claim office has just a little more work each day than it can get through with. There is neither beginning nor end to it; neither is there any end to the stupid, unsatisfactory, incomplete replies to their questions. Is it to be wondered at that the man in this office falls into a rut? He settles down into a mere effort to shove along what he finds on his desk and put in the day.

The agents and others whom he deals with are not slow to

feel this and follow suit. The claimant also feels it and becomes first impatient and then an enemy. The result is the present unsatisfactory condition.

Mr. Schneider's suggestion that special men be employed to go over the ground and trace goods is worthy of consideration. I have seen it tried to a limited extent, and it works out well. The amount of valuable information such a man can bring in from his personal interviews with line agents, train men and terminal freight handlers would surprise some of the freight claim office men.

The methods of tracing are too cut and dried for present day use. If you will look over a few files of tracing correspondence you will find that at first we don't give him even the information we have, but wait until he asks for it, and in many cases he has to ask twice. This helps on the good (!) work, and gives him that weariness of soul that makes him look for the end of the day to escape this other thing that has no end.

I know a shipper of railway supplies who has had to follow up many shipments gone astray, and after some years' experience with freight claim office methods he prefers to do his own tracing within his own district, and even beyond it. When he fails to find the goods and sends the papers to the claim agent they are seldom found. On the other hand he has found goods in cases where the claim went to the claim agent first, and that office had failed to find them.

This does not mean that he possesses unusual ability; far from it. It only means that he has always considered himself responsible for his own business and makes every effort to look after it before turning it over to some other poor human, miles away, who cannot know more about it than he does and is not likely to know so much.

His method of tracing is to get the number of the car into which the goods were loaded and follow that car through the trainmasters and conductors who have handled it. If he has the wrong car he finds it out from the first conductor and he backs up to start over again and he soon learns many things. A few of these are: (1) That the goods may be in the freight shed, having never been loaded into the car; (2) that when they have gone forward the freight people may give him the wrong car number; (3) the goods may have gone forward without a way bill; (4) that the conductor has carried the goods past their proper destination, but has kept track of them and is waiting a chance to bring them back; (5) or that the conductor has had no bill and has the goods cached waiting to be asked about them; (6) that the way bill may read to one station while bill of lading may read to another; (7) that the agent at point to which car has been traced may, and likely will, report no trace, while yet the goods may be found by having some one look in the car, and that when a man makes a mistake in the first information given he will likely repeat it each time you go back to him, so that it is a good plan to have him checked by a second man.

It is true that this man can, as a general thing, only trace in his own territory; but suppose, as is the case, that nine times out of ten he finds the goods without going to the claim agent, and in the tenth case he sends the papers to that officer showing that the goods were in a certain car that went out of his territory on a certain date, does not this help? He has saved the handling of nine cases and narrowed the field of inquiry in the tenth case.

I think it does help. If he sends each one of these tracers through the regular channel this is the mode of procedure: The shipper sends local agent notice of lost shipment; agent sends this to claim office; claim office gives it a number and file and returns it to agent for record of shipment; agent may, or may not, give complete record; if he does not it comes back to him again; then back to claim office to wait its turn, to be shoved out into the ring to do its weary round. It returns time and again to the claim office to be pushed out into the stream once more, while days run into weeks, and weeks into

months, with no result beyond weariness of spirit and the piling up of wrath.

As I said, the special agent idea is worthy of consideration, but my experience teaches me that most of our roads would give such a man too much territory, and he would soon be so far behind the game that he could not catch up. But suppose we try this scheme: The big roads are now cut up into well-defined divisions with a division freight agent in charge. Have shortage reports go to him and let a member of his staff trace promptly, using the telegraph and telephone, and even going out on the line when it would seem advisable to do so. Then when he could show that goods are not in his territory, send papers to next man, or if the goods have gone to connecting road, send papers to that road's claim office.

This would only be in line with the present move by our most advanced and up-to-date railway men, to make the division as self-independent as possible in all ways, on the theory that when every division of a road is right the road as a whole cannot be far wrong.

So much for a suggestion as to a cure; but have we done everything possible in the way of prevention? I think not, but I am not going into that just now further than to note what has been done by one division of a large road that I have taken notice of. On this division there is one important terminal from which a large amount of miscellaneous merchandise is sent out for distribution within a territory covering some few hundred miles and also a large amount of export freight in carload lots. When cars are placed at the shed for loading they are at once inspected by the car repairer. If passed by him the shed crew sweep them out carefully and pull out, or drive home, all nails with projecting heads in floor or walls, and then load their freight. They load with more care than I have ever seen used by other loaders and checkers. The train crews who handle and distribute this freight understand what care has been taken in selecting cars and loading, and they are held responsible for safe delivery. The result is that they see the goods placed in way station sheds in good order, with the responsibility transferred to the agent, and the agent, to protect himself, will see that they are in good order.

Claims for shortage and damage are almost unknown on this division, so far as shipments originating on the division are concerned, and the people served are generally most friendly to the railway and its officials.

To my mind this is proof that not all of us have done all that we might do in reducing the number of claims, nor what we might do in tracing promptly. Prompt tracing often means successful tracing. Every employee should be interested in this subject, and especially storekeepers, trainmasters, train crews and car repair men. The storekeeper, because he frequently finds strayed merchandise in cars with company's material, and can have it returned to proper channel. The trainmasters and their men, because they are there to forward goods, and do it right. And the car men, for the reason that goods are frequently left in cars that go on to repair sidings.

Does all this mean that the general claim agent's office goes out of business? No, indeed. It may reduce the staff slightly, but there will still be plenty of business for the office to do in handling the claims to and from connecting roads, and, of course, that office must be the court of final resort in domestic claims when the divisional men fail to locate the stray goods. But the many cases where goods are found by divisional men need not go there at all.

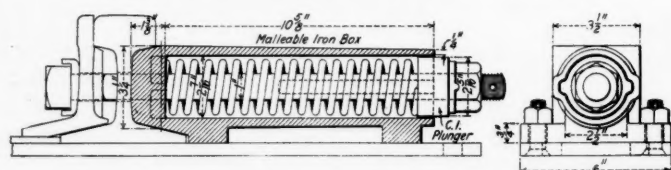
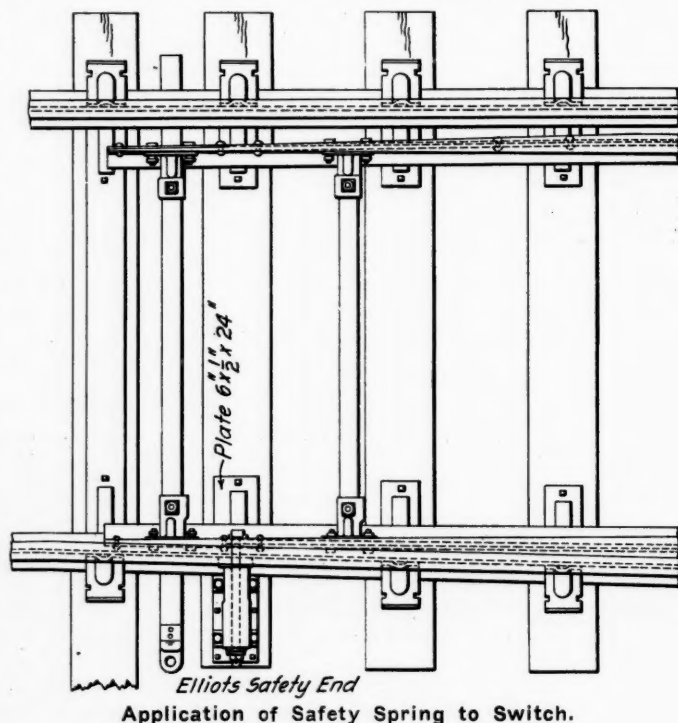
There must be some central point and recognized official to pass final judgment on all cases where the railway must pay for lost goods, and to deal with foreign roads; but any man who goes out on the line and finds the missing shipments at stations where the agents in charge have stated positively that they had no trace of them, knows how futile are the efforts to trace by forms through the train mail.

ERNEST J. MCVEIGH.

Contributed Papers.

SAFETY SPRING FOR SPLIT SWITCHES ON THE WABASH.

The Wabash is applying to split switches at outlying points, especially on side tracks seldom used, the safety spring shown herewith, to prevent accidents from broken



Detail of Safety Spring.

connections, broken switchstands or connecting rods. The details of the device and its application are made quite clear by the drawing. The cost is about \$3 each.

FOREIGN RAILWAY NOTES.

A consular report says that a party of British engineers recently started for Bering Strait to make a survey for a railway.

The *Staatsanzeiger für Württemberg* notes the delivery to the Württemberg State railways of "heavy 12-wheel express locomotive of a new kind, originating in America," intended to haul heavy trains up steep grades without a helper.

Speyer & Co. and the National City Bank, New York, have closed negotiations with the Central Railroad of Haiti for the purchase of \$800,000 Central Railroad of Haiti 10-year 6 per cent. collateral trust gold bonds. The Central of Haiti, a New York corporation, is the holding company, controlling the Plaine de Cul du Sac Railroad Co., operating for the last five years the system connecting the capital, Port-au-Prince, with neighboring sections, also controlling the construction of a modern steel wharf in the harbor of the capital. The bonds are secured by first liens on all the properties of the subsidiary companies, and annual subsidies secured by pledge of important public revenues of the Haitian government.

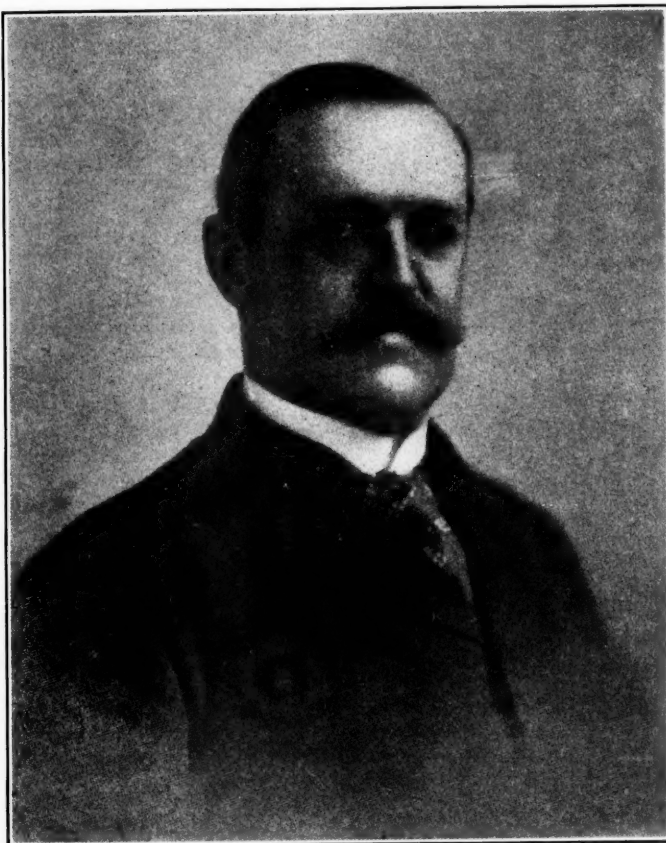
SAMUEL MORSE FELTON.

Samuel Morse Felton, president of the Mexican Central and chairman of the board of the Tennessee Central, has been elected president of the Chicago Great Western, effective September 1. The Great Western is in urgent need of physical reconstruction on a sound basis, and Mr. Felton's election indicates that it is the purpose of the new management to begin at once a thorough rehabilitation of the property.

Few railway officers have had and are still having so varied a career as that of Mr. Felton. Although still in middle life, he has nevertheless seen service on more than 15 different railways, and has been a general officer of ten of them. In an official life with so many changes one naturally looks to find the cause, and here they are not far to seek. He was educated as a civil engineer and at once entered railway service in this department. He became a chief engineer before he was at all concerned in any other department of railway work. The work of the engineer, as we all know, develops that habit of mind which takes into account certainties rather than probabilities and diplomacy. In Mr. Felton's early service as a general officer this habit was over-developed—it was undoubtedly a fault. He was impatient of diplomatic delays; he looked at the art of transportation structurally; he applied to its development the principles and methods of the science he had studied and knew well. His early methods as a general officer were quite comparable to those of the late James D. Layng, although they grew up from entirely different sources. Mr. Layng never hesitated to direct a shop foreman or master mechanic or trainmaster or traffic solicitor, or any similar minor officer, either verbally or by letter, in the details of his work, ignoring entirely the semi-military relation that exists and should exist between the head and the department officers all along down the line. So also would Mr. Felton frequently, and impatiently perhaps, ignore his heads of departments and issue orders direct to their subordinates without consultation. This was never within our knowledge ignorantly done. There was uniformly a fine result to be accomplished, but quite an unnecessary short circuiting. Mr. Felton has outgrown his earlier faults, which may or may not have caused some of his earlier changes in employment and service; nevertheless, he has always continued to be a direct-acting engine and is still somewhat impatient of slow forms of procedure. All these things, however, concern the manner rather than the substance of his work. His work of recent years might be called that of a railway physician. He has been much sought after as president in cases requiring drastic treatment. Always a student, with robust health which has enabled him to put no limit to the exercise of his faculties and his considerable store of railway knowledge, he has been called from one difficult problem to another until now he has to deal with a railway system

built up by the perhaps greatest railway theorist and surely the most impracticable railway officer that this country has developed. He has trouble ahead of him, but the existence of this trouble is the reason for his invitation to attempt to solve the problem of making the Chicago Great Western Railway a useful member of society.

Mr. Felton was born February 3, 1853, at Philadelphia, Pa. He was educated at the Massachusetts Institute of Technology and began railway work in August, 1868, as rodman for the Chester Creek Railroad, now a part of the Philadelphia, Baltimore & Washington. From 1870 to 1874 he was successively leveler and assistant engineer of the Lancaster Railroad, now a part of the New York, New Haven & Hartford; engineer in charge of surveys of the Chester & Paoli Railroad, and chief engineer of the Chester & Delaware River, now a part of the Philadelphia & Reading. In August, 1874, he was appointed general superintendent of the Pittsburgh, Cincinnati & St. Louis, and in September, 1881, his jurisdiction was extended over the Cincinnati & Muskingum Valley and the Little Miami, now a part of the Pittsburgh, Cincinnati, Chicago & St. Louis. In January, 1882, he was appointed general manager of the New York & New England, now a part of the New York, New Haven & Hartford, and in February, 1884, was made assistant to the president of the New York, Lake Erie & Western, now the Erie, in special charge of the New York, Pennsylvania & Ohio, and later was appointed general manager of the latter road, also now a part of the Erie. In January, 1885, he was elected vice-president of the New York, Lake Erie & Western, in charge of the traffic department, and in October of the same year his jurisdiction was extended over the operating department. From November, 1890, to March, 1892, he was president of the East Tennessee, Virginia & Georgia, now a part of the Southern Railway, and from 1890 to 1895 was president of the Alabama Great Southern also. In November, 1890, he was also elected president of the Cincinnati, New Orleans & Texas Pacific, and in March, 1893, when that road passed into a receivership, he was appointed receiver, severing his connection with the road in October, 1899, when the receivership was dissolved. He was elected president of the Chicago & Alton on September 7, 1899, which position he resigned November 26, 1907, to become president of the Mexican Central. He is a member of the American Society of Civil Engineers.



Samuel M. Felton.

In Russia, according to a correspondent of the *Deseret News*, Salt Lake City, young women, educated as engineers, are now to be found at work directing operations on important new buildings and on masonry and other structures. At the St. Petersburg Technical College several hundred women have been studying during the past four years, and the first class has now been graduated. The women engineers of this first class to be graduated are said to give highly satisfactory service.

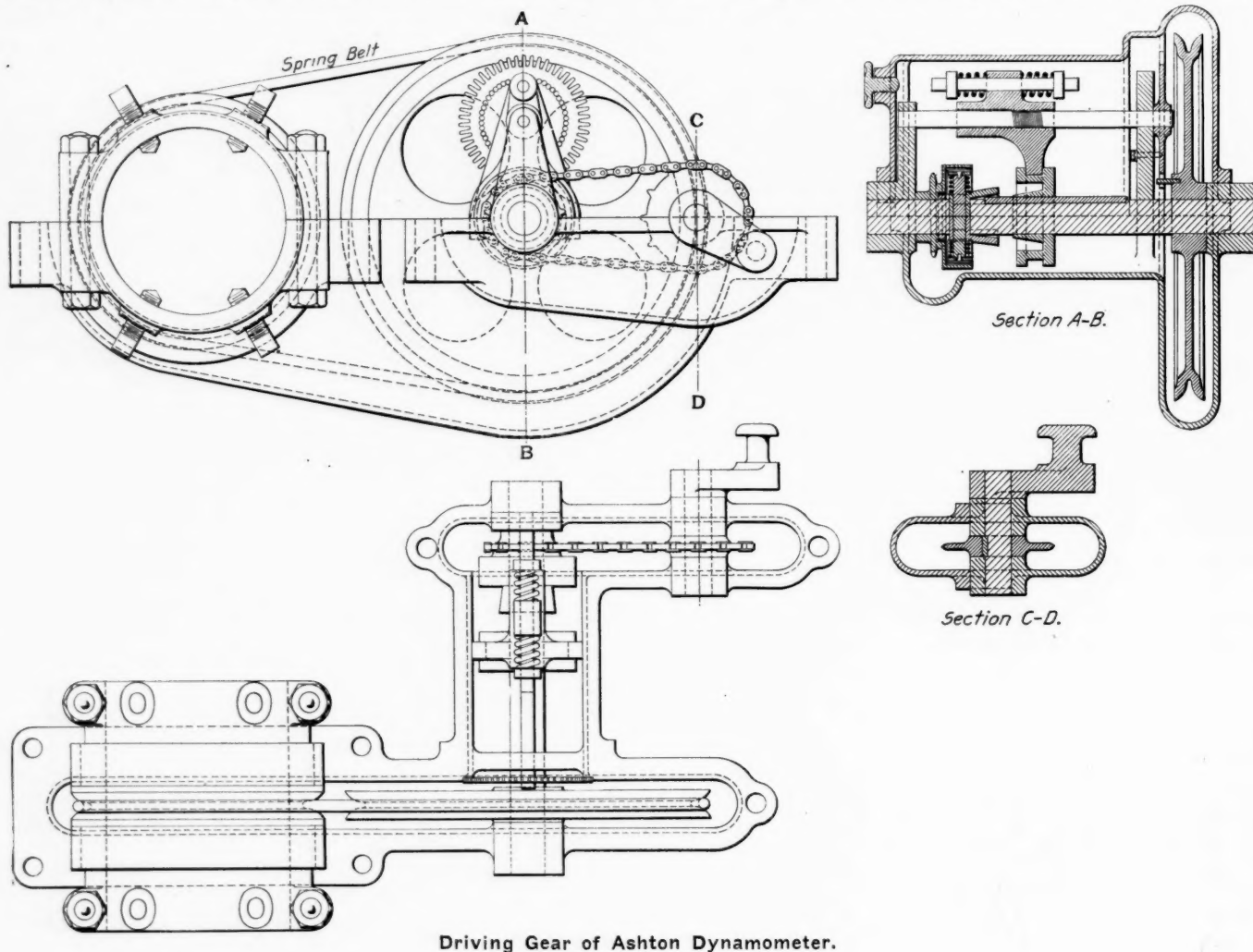
ASHTON LOCOMOTIVE RECORDING DYNAMOMETER.

The cost of dynamometer cars and the expense of running them have limited their use. Moreover, records of performance obtained with them should be available in sufficient numbers to allow many comparisons to be made of similar runs. When only one dynamometer car is used on a large railway continuous records cannot be made on any one division, and those that are obtained usually represent widely varying conditions. If a dynamometer record of every trip could be kept the hauling power of each locomotive would be satisfactorily established. Such records would place the responsibility for engine failures; they would enable the engineers to see at any time what the locomotive was doing, and would help officers to select competent men for promotion.

The Ashton locomotive recording dynamometer is the invention of S. T. Parks, superintendent of motive power of the Chicago & Eastern Illinois, who has been working for a number of years to perfect the device. The first public test was made July 27, 1909, on the Chicago & Eastern Illinois at Danville, Ill., in the presence of a number of railway officers representing several roads. The dynamometer was installed on consolidation engine No. 350, having 21-in. x 28-in. cylinders and a rated tractive power of 39,100 lbs. The train consisted of 46 cars of coal, weighing 2,964 tons gross, an observation car weighing 23 tons and a caboose weighing 18 tons, making a total gross weight of 3,005 tons. The run was from Dickason, Ind., to Gessie, about six miles, with a maximum grade of 0.45 per cent. A fac-simile of the record made on that trip, which is given herewith, illustrates the use of the device. The dynamometer itself, its position in the cab, the arrangement of the necessary connections, and assembled details of the parts are shown in the illustrations.

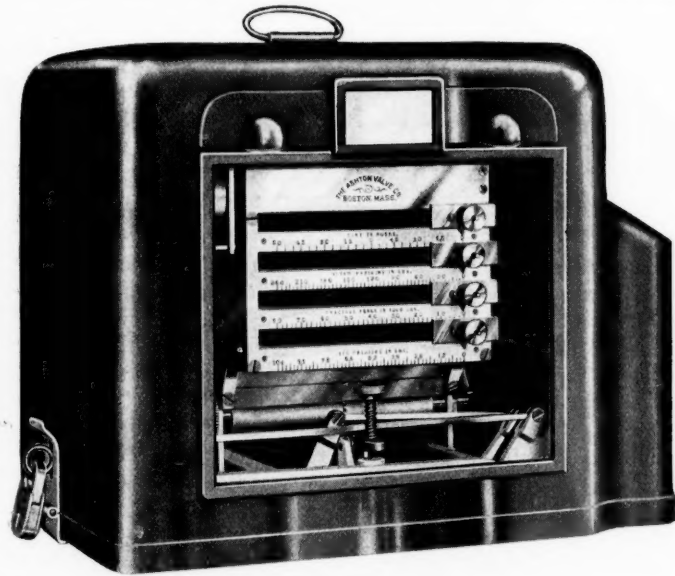
The most important feature of the device, and one in which it is peculiar, is that the record paper is driven from the axle instead of by clockwork. The record is thus made permanent and can be understood at any future time. The record ribbon has the grade and alinement of the track laid out on it in advance, with the miles marked and divided into quarters. The motion of the paper is calibrated for 1 in. to the mile. On the forward axle of the tank is an 8-in. sheave, which is belted to a 12-in. sheave mounted on one end of a 1¼-in. shaft. On the other end of the shaft is a friction clutch, which, when thrown in, turns a 3-in. sprocket sheave connected by a bicycle chain to a 4-in. sheave, having a 5-in. throw crank located outside the casing which encloses all the gearing. A flexible rod is used to transfer the motion to a point below the cab, allowing any slight difference in the position of engine and tank, due to curves and inequalities in the track, to be taken up. The horizontal rod transfers its motion through a bell-crank to a vertical rod running up through a brass tube to the dynamometer in the cab. This tube contains a spring to furnish the return movement of the rod. In the dynamometer this rod moves a short lever which turns a ratchet wheel geared to a spindle over which the paper rolls.

In case the engine is being used on the road, no record is wanted of the runs necessary to back in on sidings, but for a switch engine it is desirable to have a record of the runs in both directions, as they are of equal importance. To meet this requirement an ingenious attachment is added in the casing on the axle. A small auxiliary shaft carries a star wheel at one end, which is engaged by a pin on the 12-in. sheave. This shaft is threaded for part of its length and carries a sliding bar which controls the friction clutch. A set screw is placed in the casing to form a reverse stop for



Driving Gear of Ashton Dynamometer.

the sliding bar, and when set at the inner position it throws the sliding bar back on the threaded portion of the shaft when the locomotive starts to back. This movement of the



Ashton Recording Dynamometer.

bar throws out the clutch, which is carried back along the threaded shaft as long as the backward motion continues. When the locomotive starts forward again the motion of the sliding bar is reversed, which carries the clutch back, and when the same distance has been run forward that was previously run backward the clutch is thrown in and the record in the dynamometer taken up where it left off. When the set screw is at its outer position, however, the sliding bar does not come in contact with the reverse stop and the friction clutch is in constant contact, giving a continuous ribbon in the gage regardless of the direction of running.

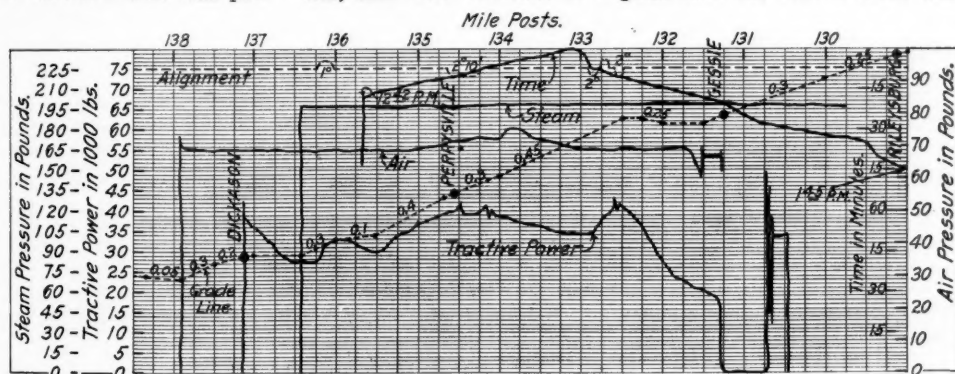
The time curve is registered by clockwork which is geared to a cam in the ratio of 1 to 4, making the cam move two turns to the inch and 2 in. to the hour, crossing the 4-in. ribbon in two hours. The cam is grooved in both directions so that the motion reverses on reaching the edge of the paper. This plan of reversing the time curve allows a run of any desired length to be registered on one sheet of paper.

The tractive power is registered hydraulically by means of a cylinder of oil. The cylinder, which is $7\frac{1}{2}$ in. in diameter, is secured to the center sills of the tank at the back and cast

integral with the end sill brackets. The drawbar pull is exerted on a ram by means of a yoke. The cylinder is about 10 in. long and has $1\frac{1}{4}$ in. filled with oil. If this oil should by any means escape from the cylinder no harm would be done, as the possible ram movement of $1\frac{1}{4}$ in. is the ordinary coupler movement. There is, however, a device to prevent the loss of the oil. Any oil escaping past the ram is carried by a duct to a chamber fitted with an ordinary pump valve and connected to the rear end of the cylinder. When the pressure is removed from the oil by the engine stopping, a suction is created which pumps the oil that has leaked out back into the cylinder again. Thus about a third of a gallon of oil will last indefinitely. The pressure in the oil is transmitted to the front of the tank through an extra heavy pipe, and from there to the cab through a coiled copper pipe. The latter is connected to a fixed cylinder $\frac{3}{8}$ in. in diameter, set within a movable cylinder. The oil pressure acts on the piston of the fixed cylinder, which in turn moves the outer cylinder, to which is attached a lever system which transfers the motion to the indicating point and pen. A spring in the space between the two cylinders works against the oil pressure and furnishes the return movement.

The steam pressure and the air pressure are obtained by connecting the boiler and the train line, respectively, to double cylinders similar to the one described above.

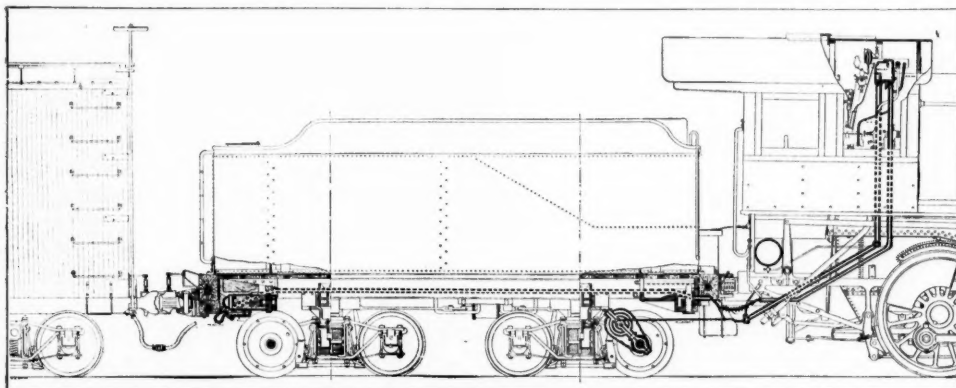
Since the time curve does not indicate directly the velocity at any given point, a device for that purpose has been added for the convenience of the engineman. This device is a small pump which is operated by the motion of the rod from the axle which rolls the paper. Colored oil is pumped into a vertical brass tube with a row of small orifices. At the bottom, this tube connects to a glass tube set over a scale cali-



Dynamometer Record.

brated to read miles per hour. The discharge of the pump is directly proportional to the velocity, since its action is obtained from the movement of the axle. The height to which the liquid rises in the brass tube is proportional to the discharge, since it is determined by the number of small holes necessary to discharge that quantity. The height of the liquid in the glass tube is, of course, the same as that in the brass tube, and therefore the height of the liquid in the tube is a direct measure of the speed.

On the record sheets the curves are offset from each other a distance of $\frac{3}{4}$ in., owing to the position of the pens in the dynamometer. The tractive power curve is taken as the standard and, in starting, the point on the plotted line corresponding to the actual position of the locomotive is set under the tractive power pen. Since the motion of the paper is obtained from the actual travel, this relation of points on the tractive power curve and points on the line will



Piping and Connection for Dynamometer.

always be true. But, as stated above, the starting points of the other curves are offset, and to read a set of simultaneous values from the four curves some scale would have to be used which would apply this correction.

The degree of accuracy obtained by this dynamometer is fully as high as that expected in the use of the dynamometer car, according to men experienced in the work of such cars who have seen the Ashton dynamometer work. On account of the ease of testing the various readings there should be no excuse for the device being left out of order. The steam and air gages in the cab furnish a constant check on those readings. The tractive power indicator may be easily tested with a hand pump, for, knowing the area of the oil ram, it is a simple matter to compute the pressure per square inch due to any given tractive effort. The clock work may be tested by comparison with a standard watch. Although easy to test, the device is too complicated for enginemen to tamper with it so as to make their runs appear satisfactory. The result of any tampering would be that the dynamometer would show that it was out of order and the same crew could not turn in doctored records many times before an investigation would be made.

The dynamometer is to be manufactured by the Ashton Valve Co., Boston and Chicago.

HOW TO BE A FIRST CLASS TRAINMASTER.

(SECOND PRIZE ARTICLE.*)

BY F. L. RODMAN,

Trainmaster, Atlantic Coast Line, Savannah, Ga.†

The trainmaster's success depends on many things: the volume of business, the facilities and his own practical knowledge of the work before him, as well as his good judgment of the loyalty of his lieutenants and their forces. Ability to hold a position does not signify success.

As you take up the lines laid down by your predecessor, study well his methods, that you may profit by his successes as well as by his mistakes. Ordinarily the trainmaster, in his maiden effort, has had no practical experience, making immediate success impossible. He must, therefore, in his newness to the position, keep before him the fact that every man is taking his measure; that in the sanctum sanctorum of the "sand house" the "boys" are laying for every move he makes; are waiting for his "mistakes." They are discussing his ideas of discipline and classing them as broad or narrow. While it is well to avoid "rubbing the fur the wrong way," show your hand early. Let it be known that you have no friends to reward or enemies to punish. Then seek by all honest means to establish yourself with the men—never have a following—and you have started right with the working forces.

Be forceful and determined, but be right. Under all circumstances practice a Taft smile and show the boys:

"'Tis an easy way to be pleasant and gay
When the work moves along like a song;
But the man that's worth while, is the man who can smile,
When everything goes dead wrong."

The trainmaster must have an attentive ear, a still tongue and a cool head. If he have not the latter let him resort to the means used by a trainmaster of the Alton some years ago,

who, when confronted with a rush of business, applied a wet sponge to the back of his head, and waded in. When things went wrong it was a common remark that "the old man had left off his sponge."

With all regard for the various brotherhoods, I believe it better that the trainmaster be free of all affiliation with any order, but friendly to all.

The successful trainmaster must of necessity have a thorough knowledge of his superiors. He must know what they look upon as good results. If he differ in opinion, he should express himself frankly, but certainly offer no opposition to the execution of the instructions.

TERMINALS.

Here is where many a man has found his Waterloo. Recent years have brought about almost the full elimination of the trainmaster from the large terminals because, usually, of his unpractical instructions and untimely interference. A capable yard force at every terminal, or intermediate yard, is of the greatest necessity for his success. Block your yard and you block the line. The yardmaster must be all the name implies. His position is the most difficult and trying of all. He should employ his own men, and have a voice as to yard power needed and its distribution. He should recommend all yard discipline. In short, he should be turned loose with a free hand.

The local agent should have no voice in the yard policy whatever. To permit such a course means expense and confusion. Wherever I have seen the plan tried it has proved wholly unsatisfactory and impracticable.

A terminal of any consequence should switch all cars on the card system. The conductor, on arrival, delivers his bills to the clerk, who examines each one closely for its regularity and makes a card accordingly. By this method the cars are switched to proper positions and cannot be lost sight of. If a car gets out of place it is quickly detected. A good yardmaster, notwithstanding his tracks are classified for the outgoing and the incoming, for connections and industries, for the house and team tracks, and so on, goes over his yard once a day at least. He notes perhaps that several parts of trains are left from yesterday; that the "hold" tracks have not been pulled. He sees the print of some derailed cars. By a glance he catches all oversights and cases of neglect. The trainmaster must pursue the same methods at such times as opportunity permits or conditions demand. He is then in command of the situation.

It is always good policy to consider the counsel of those who know more than yourself. I am reminded of my early days as general yard master for the Alton at Chicago. In those days C. H. Chappell, now deceased, was general manager. Mr. Chappell's hobby was terminals. He made me many an unexpected visit, and as I later discovered, came not only inspecting, but to instruct, as well as to draw out all there was in a man. His practical knowledge seemed to direct him unerringly to every weak spot, and within a few hours my attention would be called to rank irregularities he had observed, of which I was totally ignorant. I soon saw that he, general manager, knew more of my terminals than I, the general yard master, did. However, I was glad to take his advice. He could analyze men and conditions as no other man could, and spur one on to better things. It is with pride that I say I owe my early training to Charles H. Chappell.

The office trainmaster is bound to be incompetent. He can have no knowledge of the actual conditions, and in times of distress gets blocked. He fancies his "desk" is about all there is to it. Stale way bills can be and are hid out. But neither old cars, nor bad conditions can be covered up.

Establish classification in the make-up of your trains; the policy of building to the next terminal only, invites congestion. Inbound trains should be promptly broken up, and the forward movement made up. Put it up to the motive power

*Second prizes were awarded both to this paper and to one by J. J. Pruett, published last week.

†Mr. Rodman was born at Dwight, Ill., and began railway work at the age of 15, as water boy. In the 27 years since this beginning he has been foreman of construction, fireman, hostler, telegrapher, yard foreman, yardmaster, assistant trainmaster and trainmaster. He has worked on the Illinois Central, the Baltimore & Ohio, the Missouri Pacific, the Great Northern, the Southern, the Cincinnati, Hamilton & Dayton, and the Northern Pacific; and, lastly, on the Atlantic Coast Line, where he now is. He has been on the A. C. L. two years. In his letter he says that in every case he has resigned his job voluntarily, either because of a prospect of improving himself, or because he did not wish to carry out the policy of his superior.

department. Be in position to accept all engines when offered. Do not criticize what appear to you to be poor results. You see the effect; make a still hunt for the cause.

The over-anxious trainmaster, in his desire to do something, resorts to imperative orders, which may prove disastrous, or ridiculous. To illustrate: A few years ago while I was employed as general yardmaster at a large terminal in a northern city, a passenger conductor was made trainmaster. Times were distressing; a bitter winter and rushing business. On assuming the position, "Uncle Henry," as he was known, instructed me as follows: "Take off two engines immediately. I've just learned that on this date one year ago you were working but twelve engines. Understand, I am here to take care of the company's money." He was not aware of the increase in business over the previous year, nor that a comparative statement showed a handsome decrease in cost of cars handled. I "saw it coming" and we parted. The block came, the embargo followed and "Uncle Henry" returned to his guardianship of the "company's money!"

A terminal of any consequence should keep a "camp" record. The bills should be classified numerically so as to be obtainable at the first touch, and hands off to all outsiders.

Stub tracks are a nuisance. Bumping posts do not do the business. Best of all is a continuation of the track underground for about one rail length and three feet deep at the end. Do not permit the use of banks of earth and wood as back stops. It is destruction to the cars and endless trouble for the trainmaster.

BAD ORDER CARS.

Here is a serious problem; one that causes more claims, complaints and congestion than the shortage of power. Bad orders are principally the results of carelessness, and the automatic coupler. It does not matter how hard a car hits, it couples. In the days of the link and pin, the field switchman governed the speed. His life was at stake, for the coupling had to be made as the cars came to him. Shifting lumber in box cars was almost unknown. The cure of rough handling is as yet an unsolved problem. It should be given close watching and cannot be handled too severely.

The repair tracks should be classified, particularly at shop yards. Heavy repair cars together, light repairs, wheel cars and loads separated. Give them the best of switching service. Keep regular men on the job. Bad order transfer cars will also give much trouble if not closely watched. See that they are assembled and placed at such prescribed hours as best suits those interested.

All trains should be inspected on arrival at and before leaving a terminal.

EMPLOYMENT AND ASSIGNMENT.

Never delegate the employment of men to others. You will have a deeper feeling of responsibility and pride in men of your own choosing. It is easier to employ a man than to dismiss him. Therefore, too much care cannot be exercised. If occasionally you may err in your selection, you can wait. The undesirable man weeds himself out.

I do not favor the form of application for employment as used by most roads. The reference portion is a nuisance and affords opportunity for deception. Let every man stand on his merits. If he is an imposter, he "fixes" his references, or refers you to roads that do not give them. If physically out of the running he gets a "substitute." Some assume the names of dead men, and others live ones whose records are clear. At best, the system burdens your office with an endless and worthless correspondence.

The home boys are always preferable. Yard clerks make good candidates for positions as switchmen, and later the most valuable of foremen. Operators make good flagmen. Callers, too, make good men. The "boomer" is never desirable. He is always going to reform. But watch his first or second pay-day—he fails to respond for duty and has tackled his old

enemy, John Barleycorn, with renewed vigor. Employ him and you are always short of men and your forces demoralized.

Promote from the ranks when possible. You know your man. Be careful in your assignment of men. Avoid switching them about. Remember that in all your passenger assignments you are providing for the protection and comforts of the traveling public.

A passenger flagman or brakeman should be neat, but not talkative. Conductors should be of good appearance. You want baggage masters of fair education, at least. When competent they can save you many claims and annoyances. Keep your noisy men in freight service. They are valuable at the "sand house" conferences. A brakeman never makes a switchman. You can tell him the minute he "hits the foot board." A switchman will not make a brakeman, and is not reliable as a flagman. He was educated to be watched for, not for watching out.

A conductor, as a rule, makes a poor yard master. His customs are fixed. He is forever checking up trains and playing with the bills. He was educated to take orders, not to give them. Never spoil a good conductor to make a poor yardmaster. Make your yardmasters from the yardmen and your conductors from the trainmen.

A road engineer never makes a switch engineer. Keep him out of your yards. He cannot switch cars. He doesn't like the job, anyhow. You want the man who knows the ways of the switchman and knows his peculiarity and variety of signals; who is not afraid of unjointing his neck on the boilerhead, and who oils up at meal hours only. Be liberal with your engineers and allow something for your expectations.

ROAD CONDITIONS.

Exercise judgment in your selection of local freight conductors. They must be first-class and permanent on the job. They should have some switching experience, or else educated in local service. Pick men who like a local run, men who will be popular with the local shipper, the local agent and the dispatchers. Allow them as much latitude as possible and, if you can do so, allow them to select their own brakemen from the ranks. Nothing gives more annoyance than a poor local crew. Have your conductors understand they are in charge of their train from the pilot to the caboose, and so hold them. Any man can carry bills from one terminal to another. You want men who are equal to any emergency—who know what to do and how to do it. Don't criticize the local conductor if his judgment does not conform to your ideas.

Require clean cabooses and keep them in good repair—supplied with everything needed in any emergency. School your conductors in accuracy of records and thus have something to be depended on when needed. Issue all train books yourself and require the old ones turned in for your personal inspection before issuing new ones.

Do not permit the handling of cars over your district without proper billing. I do not favor the card way bill. I am firm in the belief that all billing should accompany the cars, both on the line and to and from connections. Irregularities in billing, necessitating the holding of cars, must be handled aggressively.

The trainmaster must know the car capacity of all industries on his district, their daily output and the service rendered. Have a personal acquaintance with the local shipper. The local agents should give you but little concern from a transportation standpoint. The loading of cars at large terminals should be in station order. All freight put into local cars should be tagged or marked, showing shipper, consignee, destination and contents. The agents at small stations should check all shipments from the billing as unloaded by the crew, noting condition.

A personal inspection of the warehouses and station and premises should be made at unexpected times, giving the

public portion of it the same attention as would a railway commissioner. See that no car service [demurrage] is overlooked; also have an eye on the per-diem.

The trainmaster should police his district at such points as conditions determine. When on freight trains I believe the rear end better than the head end for general observation. Here is a field requiring an all seeing eye—noting everything irregular.

The "surprise check" is a much discussed question, and has its pros and cons. On the whole, I support it. It makes more watchful men and it brings to your attention many irregularities which cannot be caught up with in any other way.

FELLOW OFFICERS.

The master mechanic must be your friend. He wants but little and has much to give. On him depends your switching and train power. At terminals allow no blocking of engines unnecessarily. Use every effort for the quick despatch of engines to and from the shops. Don't overload your power when it is scarce. Rely on the engineer and the master mechanic. It is not what an engine should do, but what it will do when needed the most.

The chief dispatcher is your chief lieutenant on the inside, and the trick dispatchers are a part of your family. Establish good feeling between them and your train forces. Do not permit of intolerant messages to the men; such bring no good results, but weaken and discourage. If any reprimands are necessary give them yourself and at the proper time and place. Educate your conductors to keep the dispatchers posted and to give them reliable figures.

RULES AND DISCIPLINE.

I believe conductors and engineers should stand 100 per cent on examinations relating to safety. Class meetings for the study and discussion of the rules should be held as often as possible or necessary. Insist upon the attendance of all transportation employees. Do not permit the discussion of "catch" or irregular orders. Adhere to the rules, and you can decide the question correctly and intelligently. Discuss with each man his particular duties, and inspire him to their faithful discharge.

In matters of discipline, the best of judgment should be exercised. You dare not be too easy, and you must not be too severe. Discipline is to make better and more careful men. It is to impress principles on the inexperienced and the careless. You diagnose your case as does the doctor. What is good medicine for one may not be good for another. There may be extenuating circumstances with the man or position. I believe in actual suspension, but to apply but very little of it. "Fatherly" talks bring out better men and better results. When the man leaves you he is some wiser, some better. If this procedure has not the desired effect then the fault is in the man, and you become a surgeon instead of a doctor.

The "Brown system" is too much like a patent remedy—good for all, and all ailments alike. Its one redeeming feature is that it never distresses a man nor his family by actual suspensions.

Never parley with the "drunk." This reminds me of Superintendent G—— at Little Rock on the "Mountain." He was troubled with one of these "periodical fellows," and decided to dismiss him at the very next offense, and wrote him as follows:

Mr. John W——n, Foreman.

Dear Sir:—You have one more drunk coming, but mind you that's all.
Yours truly,

F. J. G——n, Superintendent.

John W. got drunk when the spell came on, and Mr. G. "fired" him. The point was raised: Did he have permission to get drunk? The General Superintendent decided that he had, and ordered his reinstatement, and no more permits to get drunk to be given.

GENERAL.

The trainmaster is the key to the operating department of his jurisdiction. The higher officers expect results and not excuses; they want the work well done and full value for the money expended. He should, therefore, have a working knowledge of every department. If he come into the position inexperienced, then he must rely upon his observations and good judgment and apply himself arduously. As he goes along opportunities will present themselves, enabling him to correct defects and improve methods. The earnest and painstaking trainmaster will master every detail, and thus will secure the loyalty of his men, and they, in return, will ask only a "square deal."

TRAIN ACCIDENTS IN JULY.

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of July, 1909. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the cases of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

TRAIN ACCIDENTS IN THE UNITED STATES IN JULY, 1909. Collisions.

Date	Road.	Place.	Kind of Accident.	Kind of Train.	No. persons reported— Kil'd. Inj'd.
1. Nor. Pacific....	Sentinel Butte.	rc.	Pt. & Ft.	0	9
6. Cent. Vt.....	S. Windham, Ct.	bc.	P. & Ft.	0	3
6. Boston & M.....	West Lynn.	rc.	P. & Ft.	0	3
9. L. I.: B. R. T.....	Brooklyn, N. Y.	xc.	P. & P.	0	19
10. Denver & R. G.....	Helper.	bc.	P. & Ft.	3	5
15. Chic., Kal. & S.....	Shultz.	bc.	P. & Ft.	2	7
16. Chi. & E. Ill.....	Royal.	bc.	P. & P.	3	2
16. C. St. P. M. & O.....	Emerson	bc.	Pt. & Ft.	0	1
16. Great Nor.....	Brook Park.	rc.	P. & Ft.	0	5
21. S. P. L. A. & S. L.....	Moapa.	bc.	Pt. & Ft.	0	3
21. D. L. & W.....	Ediemans.	xc.	Pt.	1	0
22. W. J. & S.: C. N. J.....	Bridgeport Jct.	xc.	Pt. & Ft.	2	1
24. Balt. & Ohio.....	Philadelphia.	xc.	P. & Ft.	2	0

Derailments.

Date.	Road.	Place.	Cause of derilmt.	Kind of train.	No. persons reported— Kil'd. Inj'd.
1. Kan. City So.....	Frierson.	Ms.	Pass.	0	8
7. Chi., B. & Q.....	Burl. Jtc., Mo.	washout.	Pass.	0	0
†7. A., T. & S. F.....	Pomona, Kan.	Washout.	Pass.	1	2
†10. Chi., B. & Q.....	Plano.	Acc. Obst.	Freight.	2	1
10. Southern.....	Blantyre.	D. track.	Pass.	0	11
11. Rock Island.....	Dalhart, Tex.	Beam.	Freight.	1	1
*12. Great Nor.....	Rexford, Mont.		Pass.	1	2
12. Sou. Pacific.....	Aragon, Tex.	D. track.	Pass.	0	1
14. St. L. & S. F.....	Kellond.	Unx.	Freight.	2	15
14. N. Y. S. & W.....	Scranton.	D. track.	Freight.	2	0
18. B. & O. S. W.....	Taylorville.	Unx.	Freight.	1	0
18. C. I. & L.....	Manchester.	Unx.	Pass.	2	6
†18. W. & L. Erie.....	Trowbridge.	Unx.	Pass.	1	5
20. Cent. Ga.....	Glenwood, Ala.	Unx.	Pass.	0	24
20. A. C. Line.....	Kendrick, Fla.	D. switch.	Pass.	0	4
20. Penn.....	Wooster, O.	Neg.	Freight.	2	3
22. Nor. Pacific.....	Durant.	Unx.	Freight.	1	0
23. A. C. Line.....	Goldsboro.	D. brake.	Freight.	0	0
23. Rutland.....	Brainerd.	D. brake.	Freight.	1	1
†24. Wabash.....	Orrick, Mo.	D. track.	Pass.	6	25
25. C., C. & St. L.....	Zionsville.	Unx.	Pass.	0	42
26. Tex. & Pac.....	Texarkana.	D. track.	Freight.	1	2
27. Denver & R. G.....	Media.	Runaway.	Freight.	0	5
31. C., M. & St. P.....	Cambridge, Ia.	B. rail.	Pass.	0	6

The most serious accident in the present list is the derailment at Orrick, Mo., on the twenty-fourth, which was due to a very unusual flood. As has already been reported, the train in this case was moving at very low speed. The two derailments of passenger trains on the seventh were also occasioned by a great flood.

In the Orrick accident five coaches with the locomotive were submerged in the swollen river. A chair car and two Pullmans remained uninjured.

At the scene of the wreck the river makes a bend, and the railway follows it. For days flood waters had threatened the roadbed, but three hours before the wreck a freight train of forty-five loaded cars passed the point safely. Eight mail clerks were saved because the roof of their car was torn off. They got out and swam to the bank.

Almost an acre of ground surrounding the scene of the wreck crumbled into the river the next day.

The collision at Helper, Utah, on the tenth, is reported as due to the failure of a flagman to properly protect his train. The collision at Shultz, Mich., was reported as due to failure to deliver a telegraphic order, and that at Royal, Ill., to a misplaced switch. The collision near Wooster, Ohio, was due to some trouble in handling a freight train on an ascending grade. A following train had been coupled on at the rear, and there was difficulty in managing the slack; and steam being shut off on the leading engine at an unfavorable moment, the pushing engine crushed the caboose and one gondola car. The men killed and injured were in the caboose. The wreck took fire and one of these men was burned to death. The derailment at Media, Colo., occurred on a 4 per cent. grade. The train ran three miles over a very crooked line before it was derailed by the excessive speed. Fourteen cars of coal fell

TRAIN RESISTANCE.

BY F. J. COLE,
Consulting Engineer, American Locomotive Co.

I.

Many of the well known formulas in general use for train resistance are very simple in construction and application because they give approximate figures for average conditions and trains, instead of more accurate determinations based on the characteristics of the cars composing the train. The figures thus obtained are usually too high for modern cars of 40 to 50 tons capacity and in some instances too low for very light or empty cars.

That the weight and capacity of cars has greatly increased

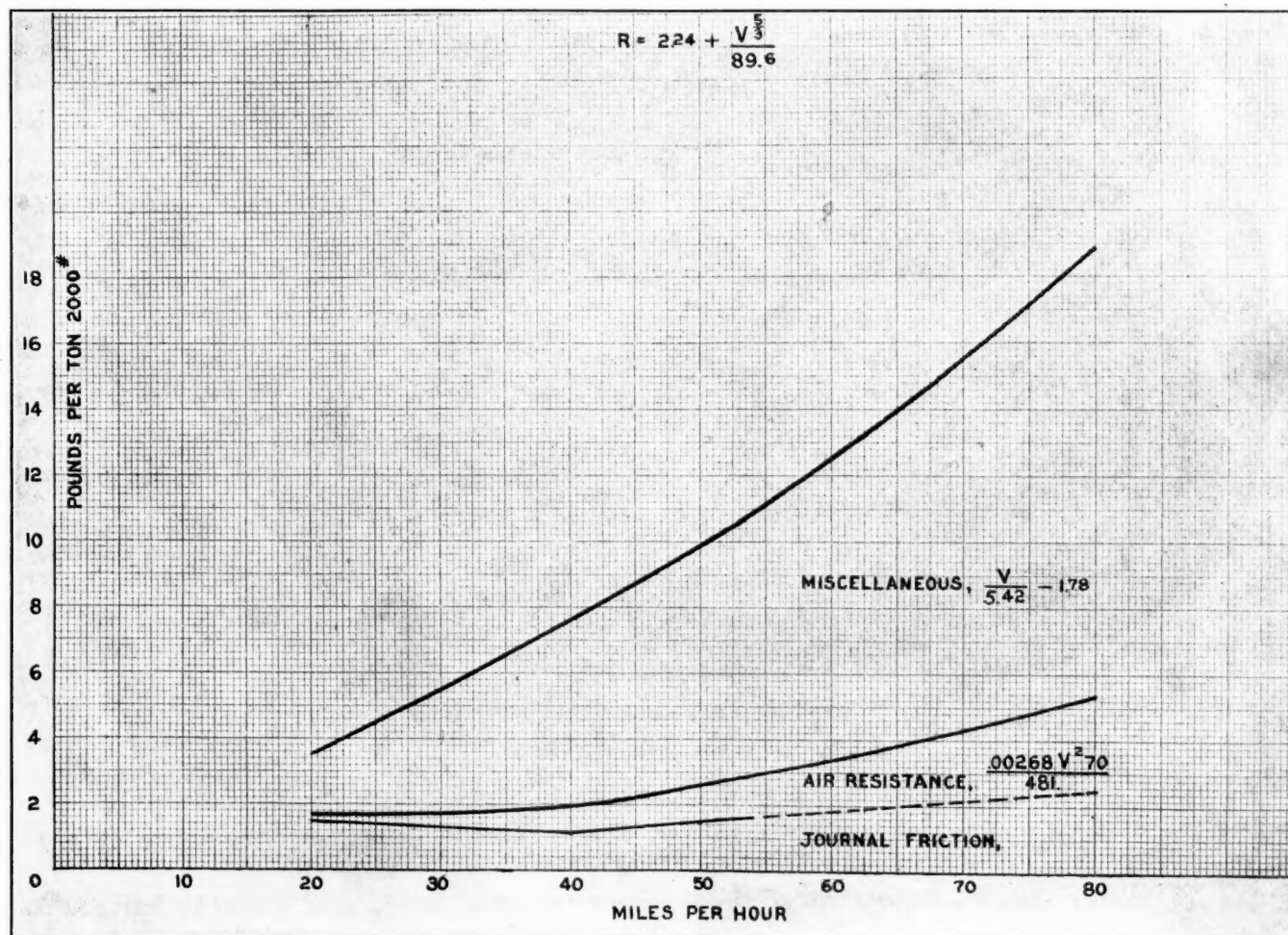


Fig. 1.—Result of J. A. F. Aspinall's Tests for 20 Bogie Coaches, About 47,000 Lbs. Average Weight, and Dynamometer Car.

down a bank and the wreck took fire and was mostly burnt up. The train derailed at Cambridge, Iowa, on the thirty-first, was the Overland Limited, and the derailment occurred at 2.30 a.m. The train was running at a high speed. Two of the victims were reported as fatally injured.

Of the 24 electric car accidents of considerable importance reported in the newspapers in July, 12 caused deaths or fatal injuries. Two of these 12 were derailments reported as due to excessive speed on curves. Another derailment was that of a freight car. The twelfth accident—a butting collision on the Spokane & Inland—was the most serious accident of the month on any railway, either steam or electric, 13 persons being killed and over 100 injured. This collision was reported in the *Railroad Age Gazette* of July 31 and August 13.

in recent years is well known. The resistance per ton has been more correctly determined by means of accurate dynamometers, especially for heavy cars on well-ballasted track and stiff rails. The resistance also of cars having electric motors is known, and the power consumed in moving them has been accurately checked by comparing the current input with the dynamometer readings, so that resistances generally are more precisely known than ever before.

One of the principal reasons for the inaccuracy in the simpler formulas is that no difference was made between heavy and light and empty and loaded cars, but their wide difference in resistance is generally accepted and provided for in the best and most practical systems of tonnage rating in use at the present time. While this fact has been recognized in tonnage rating for some years, train resistance formulas con-

taining no correction for weight of cars are still extensively used in calculating the hauling capacity of locomotives.

At the present time the same train may contain empty cars weighing 10 tons and loaded cars weighing 72 tons and as the resistance of such cars on straight level track may vary from 2.2 to 8 or 10 pounds per ton, the necessity for providing for this great difference is apparent.

Now is a suitable time to depart from the simpler kinds of formulas for the determination of train resistance, and to analyze the elements forming their sum total. A number of papers with this end in view have appeared in the last few years. Some of them are valuable contributions to the subject, so that more light is being thrown upon it and much useful information gathered together.

Among the best and most interesting of these contributions which have recently appeared is the "Predetermination of Train Resistance," by C. A. Carus-Wilson, and in his paper, published in the *Proceedings of the Institution of Civil En-*

every instance, which, however carefully made, in the light of present knowledge would really amount to very little more than a good guess.

Mr. Carus-Wilson has summarized the matter by stating that "Track resistance is a negligible quantity for trains running more than 10 miles per hour, and may be neglected except in the case of a single coach or motor-car coaches with one or two trailers."

Regarding the fourth, flange action, there appears but little available experimental data to confirm or deny the assumption made by Mr. Carus-Wilson. The great difference in resistance of cars of varying weight is accounted for principally by means of flange action occasioned by the side pressure of the flanges on the rails.

He argues that this action is produced by the necessary clearance between the flanges and the rails, so that the wheels are continually moving at a slight inclination or angle to the rail, causing friction and loss of energy. The weight and wheel

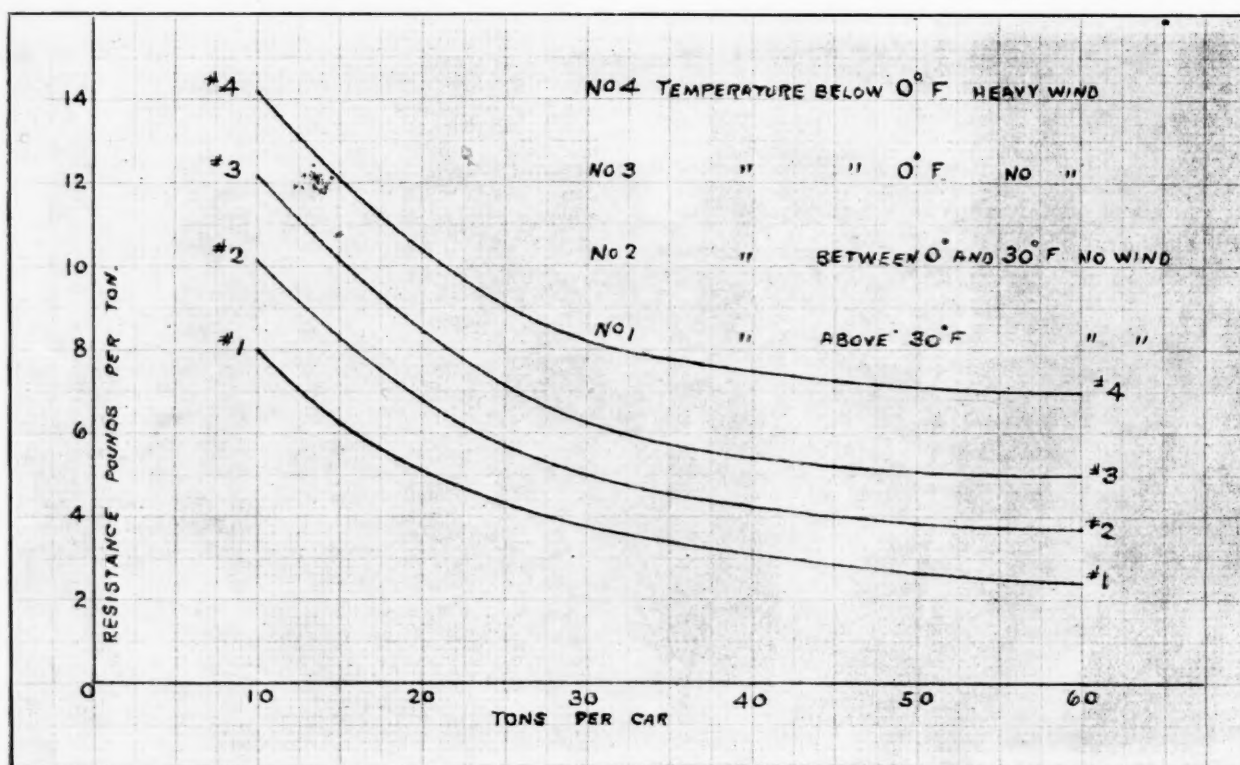


Fig. 2.—C. B. & Q. R. R. Curves of Frictional Resistance, Showing Relation Between Resistance Per Ton and Weight of Cars Under Different Weather Conditions.

gineers, London, December 10, 1907, will be found much valuable and useful information.

The elements of train resistance on a straight and level track are summarized by him as:

1. Journal friction due to the rubbing of the journals on the brasses.
2. Rolling friction due to the rolling action that takes place between the tread of the wheel and the rail.
3. Track resistance due to the compression of the track as the train advances.
4. Flange action occasioned by the side pressure of the flanges on the rails.
5. Air resistance caused by the force of the air on exposed parts.

From available experiments and tests, the values of the first, second and fifth may be fairly well estimated and suitable values and percentages of the total amount charged to these elements.

In the third element, track resistance, only rough percentages of the value are available, partly on account of the lack of sufficient experimental data and partly on account of the infinite number of variations of the condition of track which occur on any road. Certain assumptions would be required in

base of the trucks and clearances between the rails and the wheels, and the speed, make up this element, which is expressed by the equation $R = 2.94 \frac{c}{b} \frac{w}{W} V$ lbs. per ton, in which

V = miles per hour, c clearance between wheel and rail in inches, b wheel base of truck in feet, w weight of two trucks, W weight of car including trucks.

J. A. F. Aspinall, in a paper on train resistance, read before the Institution of Civil Engineers, 1901-2, states that train resistance is made up of several factors; and in a diagram which is reproduced in Fig. 1 he separates the total tractive re-

sistance found by his formula $R = 2.5 + \frac{V^5}{50.8 + 0.0278L}$ into

its components, namely:

- (a) Axle friction.
- (b) Atmospheric resistance.
- (c) Miscellaneous resistance, which includes oscillation, concussion, flange friction, rolling friction, etc.

An inspection of Fig. 1 shows that at speeds of 20 to 80

miles an hour the relative percentages of the three components are as follows:

Speed, m.p.h.	20	30	40	50	60	70	80
Journal friction, per ct.	41.4	24.2	15.5	14.0	12.1	14.6	15.6
Air resistance, per cent.	5.0	7.2	9.5	11.0	12.6	13.8	15.0
Miscellaneous resistance.	53.6	68.6	75.0	75.0	75.3	71.6	69.4
	100	100	100	100	100	100	100

The passenger cars in the above had four-wheeled trucks, weight, total, 23.5 tons (2,000 lbs.).

W. J. Davis, Jr., in a paper published in the *Street Railway Journal* and in the July, 1903, *Bulletin of the International Railway Congress* states:

"In order that a formula should possess flexibility and be capable of application to all classes of service with proper changes in the constants, it must be theoretical rather than empirical in form, i.e., all of the various items going to make up the resistance of a car or train should be properly segregated. Expressed in torque or drawbar pull, these items are:

- (a) Journal friction of the car axles, which has been found to be practically independent of the speed for properly designed bearings;
- (b) Rail friction, due to irregularities in the surface of the rails—assumed to be directly proportional to the speed;
- (c) Wind resistance, varying as the square of the speed, the cross-section and end shape of the car, and the number of cars forming a train.

"When the cars are electrically operated there is an additional item comprising gear and bearing friction of the motors."

Mr. M. R. Wickhorst, Engineer of Tests of the C. B. & Q., separates train resistance into three primary resistance, as follows:

- First—Acceleration resistance.
- Second—Grade resistance.
- Third—Friction.

"Acceleration and grade resistances are elementary resistances, dependent only upon the amount of tonnage and not upon the form of the tonnage, such as in empty or loaded cars, etc. Friction is a compound resistance dependent upon a good many conditions, such as kind of cars, load in cars, condition of track, condition of trucks, wind, temperature of weather, curves, etc. The composition of train resistance is shown below:

Train resistance	Acceleration Resistance depends on tonnage only.	20 lbs. per ton for 1 per cent. grade, or about .4 lb. for each foot of grade.
	Grade Resistance depends on tonnage only.	
	Journal. Depends on design and lubrication.	
	Rolling. Depends on solidity of roadbed.	
	Flange.	
Friction	Curve	Sliding of one tread in each pair, on the rail. Varies from 2½ to 12 lbs. per ton
	Side bearings and center plates cause flange friction.	
	Wind	Wind against body of car.
	Flange friction.	

Note.—Flange friction consists of that due to curves, side bearings and center plates, winds, etc.

"1. Acceleration Resistance.—In rating slow freight trains acceleration resistance need very seldom be considered, except on momentum grades. Here it comes as negative resistance and will be considered later under the head of momentum grades.

"2. Grade Resistance.—This, generally, is the biggest component of the freight train resistance, and is dependent only on the tonnage on any given grade. The grade resistance per ton may be figured by the following formula:

$$r_g = 20 G$$

"Where

r_g = grade resistance in lbs. per ton

G = grade in per cent.

"3. Friction.—As stated above, the frictional resistance varies considerably. The friction expressed in pounds per ton drawbar pull increases as the speed increases, decreases as the gross weight of a car and its freight increases, and increases in a general way as the temperature of the air de-

creases. It varies for freight cars at freight speeds between limits of about 2 lbs. per ton and 12 or more pounds per ton. Fig. 2 shows some curves of friction resistance of freight cars at speeds of 20 miles per hour. These curves show the relation between the gross weight per car in tons plotted horizontally and the resistance per ton in pounds plotted vertically for four different weather conditions."

Data for Eight-Wheel Coal Cars with 33" Wheels, 4x8" Journals.

	Loaded cars				Empty cars			
	A	B	C	D	E	F	G	H
Speed, m. per hr.	10.4	7.48	7.42	17.5	14.66	15.1	12.93	12.58
Wt. train, tons.	2,642	2,272	1,902	2,263	2,644	2,281	1,044	989
No. of cars.	65	54	46	56	67	57	90	90
Length train, ft.	1,863	1,508	1,350	1,587	1,875	1,565	2,660	2,570
Temp. deg. F.	60	28	25	51	45	32	69	60
Av. lading, lbs.	56,660	58,935	57,800	56,120	55,230	56,180		
Av. weight car.	23,820	24,240	24,120	23,770	22,920	22,940	22,620	21,400
Av. wt. car & lading	80,480	83,175	81,920	79,890	78,150	79,120	22,620	21,400
Resistance pr tn	3.54	3.70	3.88	4.07	4.21	4.31	9.13	11.71

Weight of train includes dynamometer car and cabin car at 26.15 tons. Average weights per car do not include dynamometer car and cabin.

("Resistance of Empty and Loaded Coal Cars," the *Railroad Gazette*, April 14, 1899, page 262.)

EXPERIMENTS OF M. BARBIER, NORTHERN RAILWAY OF FRANCE.

These experiments, which extended over a period of four years, from 1891 to 1895, were published in the *Revue Generale des Chemins de Fer* of April, 1897, and were summarized in the *Railroad Gazette* of May 21, 1897. They were made on a great variety of rolling stock, and the formula for cars with trucks transposed to English equivalents becomes

$$R = 3.2 + 2.5 V \left(\frac{V + 5.08}{1000} \right)$$

The following table gives the resistance upon level track of cars fitted with rigid and bogie trucks:

Speed in miles pr hr.		Resistance per Ton (2,000 lbs.).		Speed in miles pr hr.		Resistance per Ton (2,000 lbs.).	
		Rigid wh's.	Bogie trk.			Rigid wh's.	Bogie trk.
35		8.96	6.78	55		15.00	11.60
40		10.28	7.81	60		16.82	13.11
45		11.73	8.95	65		18.77	14.75
50		13.30	10.21	70		20.84	16.51

M. Barbier states in his report of dynamometer tests made a few years ago that Mr. Desdouts estimates a gain of from 25 to 30 per cent. in the use of the bogie trucks. Cars with bogie trucks weighed 30 tons each. It seems quite probable that the heavy American sleeping car weighing say 60 tons each would show a larger decrease in resistance per ton than the above figures.

RELATIVE RESISTANCE LIGHT AND HEAVY CARS.

J. A. F. Aspinall's experiments on the Lancashire & Yorkshire, with 10, 20 and 30-ton freight cars is given in the *Railroad Gazette* of January 6, 1905:

Grease lubrication.....	10 ton wagons, 4 wheels, 9-ft. wheel base.	
Oil lubrication.....	10 " " 4 " 12-ft. " "	
Oil lubrication.....	20 " " 4 " 12-ft. " "	
Oil lubrication.....	30 " " 8 " 4-wheel trucks	

At 40 miles per hour the resistance per ton is:

	2,000 lbs.	Tons.	2,240 lbs.
10 ton wagons, 9-ft. wheel base.....	14.6 lbs.		16.35 lbs.
10 " " 12-ft. " ".....	11.4 " "		12.8 " "
20 " " 12-ft. " ".....	12.85 " "		14.4 " "
30 " " 4 wheel trucks.....	11.1 " "		12.4 " "

From the above it will be seen that with oil lubrication there is very little difference in the resistance of the 10-ton wagons with oil lubrication and the 30-ton wagons, but the resistance for the 20-ton wagon is perceptibly higher. This test shows that if the number of wheels and journals are increased somewhat in proportion to the load, that the resistance is reduced inversely as the load.

All formulas for train resistance presuppose certain conditions, which, although they are rarely realized in actual practice, form a convenient basis for the fundamental equation in making computations for train resistance under the usual conditions of track, grades, curvature, make up of train, etc., which obtain in ordinary railway operation.

In the fundamental formula, a straight level track is assumed and the train, car, engine and tender or whatever kind of unit or make up of the train may be, is considered to be running at constant velocity at the instant when the resistance is calculated, in which the energy absorbed by accelera-

tion or given out by retardation is eliminated. It is also assumed that there is no wind, the train running through still air, the velocity of it therefore for the purpose of calculation being equal to the velocity of the train.

For practical tonnage rating purposes to this base formula must be added the resistance due to grades, curvatures and acceleration, but as the first and third are simple computations, the value being well known and established, which does not admit of much argument, they will not be discussed but merely referred to again as occasion requires. Assuming that most railways have long grades (not momentum) of .03 to .05, which increases the resistance at all speeds 6 to 10 lbs. per ton, to which must be added the resistance of curves roughly estimated to be .8 lbs. per ton. The exact value of the fundamental equation is often so much increased by grades and curves that it is not always the most vital question in practical railroading in estimating the maximum tonnage which can be hauled by a locomotive of known weight and power except on low grade roads.

One of the great difficulties in the adaptation of any existing formulæ to suit all sorts and conditions of every-day railroading all over the world lies in the complex nature of the elements which make up the sum total of train resistance.

Among the factors which influence these elements may be mentioned the following:

- (a) Arrangement of wheels; rigid wheels or trucks.
- (b) Gage of track or end play between wheels and rails.
- (c) Alignment of track.
- (d) Rigidity of track, particularly of joints.
- (e) Surfacing of track, in a horizontal plane.
- (f) Squareness of trucks or axles.
- (g) Diameter of wheels and journals
- (h) Wheel base of trucks or cars.
- (i) Condition and character of center plates and side bearings.
- (j) Kind of lubrication.
- (k) Material of journals and journal bearings.
- (l) Proportion of the total weight carried on journals, chiefly in relation to capacity of cars, and whether empty or loaded.

When the above are considered, which form only a part of the variable factors comprising possible deviations from conditions pre-supposed in any formula, some appreciation may be formed of the difficulties in making any simple equation adaptable to the wide range of conditions found on the average railroad. It would appear, therefore, that any formula to suit these wide conditions of actual practice must contain a number of variables and constants, the value of which must be determined for different locations.

In the early days of railroading, a simple equation such as

D. K. Clark's, where $R = 8 + \frac{V^2}{171}$ published in Railway

Machinery in 1855, was considered sufficiently accurate to suit the existing conditions. Other formulæ have been proposed from time to time following some simple form giving results consistent with known conditions, and recently some more complex formulæ have been suggested which attempt to more or less correctly provide for three elementary factors supposed to make up the sum total of train resistance:

1. Those which are constant.
2. Those which increase as the velocity.
3. Those which increase as the square of the velocity.

The equation then is written $R = A + BV + CV^2$. This is a distinct improvement over the simpler forms and much more accurate results are obtained, but in no sense can these equations be regarded as being more than convenient means of producing curves which approximate actual results derived from experiments. They do not analyze and divide the total train resistance into its elements.

The value of an accurate analysis of train resistance is of great value in suggesting possible improvements, also in directing attention to certain elements which comprise a large percentage of the total resistance. Flange action, for instance, at 30 miles per hour, is, according to Mr. Carus-Wilson, re-

sponsible for 30 to 32 per cent. of the total resistance in cars weighing 20 to 72 tons, and if this be true, great improvement may be possible by investigations of different methods, such as lengthening the wheel base of truck, decrease of track clearance, trucks with appliances for self-guiding to prevent side oscillation, and other expedients.

With single units operating at high speed in combination with one or two trailers, a great decrease in the air resistance can be made by shaping the ends, by the use of smooth sides and top and the elimination as much as possible of the notches or breaks between the cars, so that the entire surface, including the top, would be free from projections and present a smooth surface for the action of air, in a somewhat similar manner to the sides of a ship. The significance of this is shown in the report of the Electric Railway Test Commission at St. Louis:

"It will be noted that the actual experimental data for the flat front vestibule do not exceed 50 miles, and the reason for this is that it was impossible with the power at hand to force the flat ended car above this speed. This power was sufficient to easily permit a speed of 75 miles an hour with the parabolic wedge-front vestibule, and this fact gives force to the statements already made." (Page 752.)

A single car without trailer was used in the above. As the number of cars increase the value of the shaped end for resistance per ton rapidly decreases, and for that reason the shaped end has its greatest value for single units operated at high speeds. For trains operated by steam locomotives, the decrease in energy made possible by the use of wedge shaped ends for the locomotive, such as boiler front, cab, and various mountings and fittings exposed to the action of the air, would probably not be sufficient to warrant the increased cost. Furthermore, on account of the various exposed surfaces on the locomotive being in different planes, it would be impossible to obtain similar results for head air resistance as on a motor car, unless the locomotive was entirely encased in and made in outward appearance like a car, a construction which probably would not commend itself to American railway operating officers.

In the matter of journal friction, a correct analysis of train resistance elements makes it possible to estimate approximately, at least, the amount of energy chargeable to this item, so that the increase or decrease in friction due to materials, lubrication, or methods (such as roller bearings) may be accurately determined at their true value.

The value of a correct analysis or predetermination of the elements of train resistance, is apparent from the above, but while the difficulties in the way of splitting up the total resistance (determined by careful dynamometer tests) are very great, it does not seem they are insurmountable. Future investigation along these lines ought to result in gradually making the ultimate analysis easier, as one by one the correct amounts chargeable to the different items are ascertained, so that finally a correct balance could be struck, in which the sum of the elements would equal the amount.

In this manner relative values may be arrived at, enabling the investigator to review the whole subject with all parts arranged in their correct perspective, showing also the possible value of improvements in any one of them, so that the cost and the saving effected thereby may be ascertained correctly.

An examination of dynamometer records made by careful observers and obtained from several sources, indicates that the resistance of slow moving trains at the speeds ordinarily used in heavy freight service, may be regarded as constant between the limits of 5 and 30 miles per hour. That is, the resistance on level tangents at 30 miles an hour does not exceed the resistance at 5 to 10 miles an hour.

On this assumption, the tonnage ratings of several large railways in the United States are based. As no good and sufficient data is at hand to contest this assumption, it will be considered as correct.

In order to explain this, it is necessary to assume that one

or more of the elements which make up the total of train resistance have a maximum value at starting and reach a minimum at some speed, say 20 to 30 miles an hour, with a constant or slightly increasing value at higher speeds. Journal friction, for instance, is known to have such a characteristic, and an examination of the tests in "Friction and Lost Work in Machinery and Mill Work," by Thurston, Page 312, shows this condition very clearly. It would seem, therefore, that not only the journal friction at starting is very much greater but it does not reach its minimum value until a considerable speed is attained.

While many discrepancies exist on account of various lubricants, methods of lubrication, temperature, materials, etc., yet at the pressures and for the dimensions commonly used in railway practice, they are in a general way, substantially in agreement regarding the high initial co-efficient at starting, rapidly decreasing until the minimum is reached at speeds corresponding to 20-30 miles per hour and a constant or very gradual increase in the co-efficient at higher speeds.

("Friction and Lost Work," R. H. Thurston, Pages 312 and

from Salzburg, close to the western border of Austria, to the famous Alpine resort, Bad Gastein. The new road extends southeastward through and under a main chain of the Alps to a station of the Austrian Southern Railway at Spittal, near the lake of Millstatt. This connects it at Villack, a point a little further southeast, with the Karawanken and Wochein road, which is approaching completion, and which will cost more than \$36,000,000. This last leads to a completed railway from Trieste.

TACOMA PASSENGER STATION.

The new passenger station of the Northern Pacific at Tacoma, Wash., now under contract, will be at a point on Pacific avenue, where the tracks lie 27 ft. below the street level. This peculiarity forms one of the dominant features of the architectural problem.

The outgoing passengers enter the station from Pacific avenue, purchase their tickets and check baggage, then descend one flight of stairs to the concourse. The concourse extends



Tacoma Passenger Station.

314, 1887, and "Railway Location," A. M. Wellington, Pages 913-924, 1887).

The data which have been collected on the elements given in Mr. Carus-Wilson's paper, together with some discussion on their probable values, will be given in the next chapter.

(To be continued.)

FOREIGN RAILWAY NOTES.

The Sapucahy Railway has been granted a concession by the government of Brazil for building a section of the Oste de Minas Railway, running from S. Bicente, Brazil, to Bon Jardin.

The French State Railways since the acquisition of the Western company's lines, a considerable system, have let contracts for 20,000 tons of rails to five different French works at \$31.02 to \$32.30 per ton.

The Tauern Railway, which was opened July 5, has cost \$18,800,000, the Tauern tunnel, 27,960 ft. long, alone having cost \$6,630,000, while there are many other tunnels, bridges and viaducts. It extends from a railway extending southward

across the tracks beyond the building proper and from it covered flights of stairs and elevators conduct traffic to the various train platforms below. In opposite manner, the incoming passengers are raised to the concourse and thence ascend to the main floor and exit on the street. Thus the difference in grade between the street and the tracks affords the solution of the problem of conducting traffic safely and without interruption across the tracks.

The entrance to the station from Pacific avenue is through an arch over 40 feet wide, whose curving lines are repeated and swelled above in the broad metal swathed dome. Under the dome rises the ample vault of the main waiting room, supported on four piers connected by four arches which shelter the ticket offices, telegraph, parcel room, bureau of information, news stands, and all such accessories. From the two lateral arches, doors lead to the two flanking wings which house the separate waiting rooms and retiring rooms for men and women, dining rooms, baggage, check rooms, etc. Between the large arches of the waiting room run mezzanine balconies forming an interesting retreat from which may be viewed the travel beneath.

The floors of the building are of terrazzo, with borders of marble and mosaic; marble forms an important part of

the wall treatment. The dome of the waiting room is deeply coffered in stucco, and is crowned with an eyelet, admitting direct light of the sky, mingling with that from the large arches over the entrance and the one overlooking the tracks.

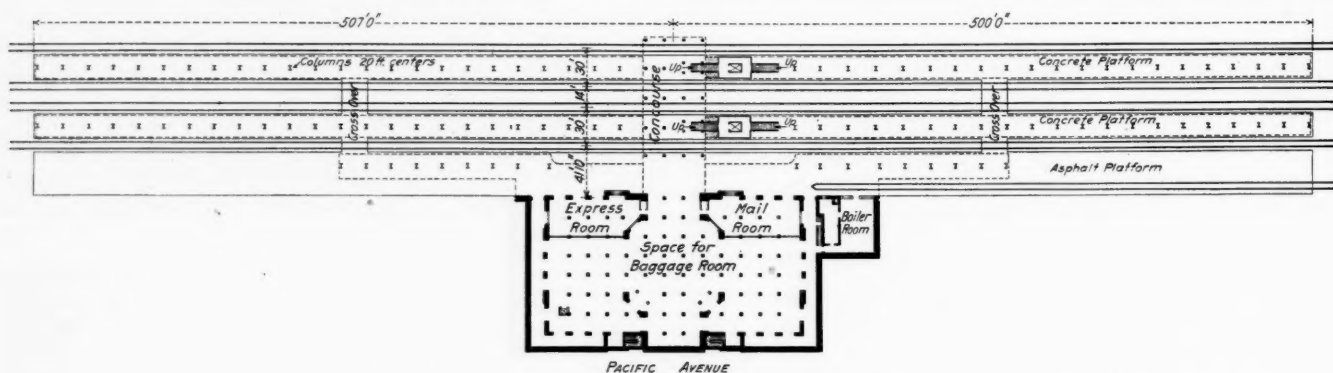
The facade on Pacific avenue is 200 ft. long, of brick trimmed with stone. The needs of the building require on the street but one story, which is made unusually high. There are two stories beneath the street, the higher one containing the concourse, which is reached by four broad staircases from the four corners of the large domed waiting room above. The rest of this floor is devoted to railway office space and the

80,000 tons have been already sold, of which 55,000 tons have been bought by the government and the rest by private firms.

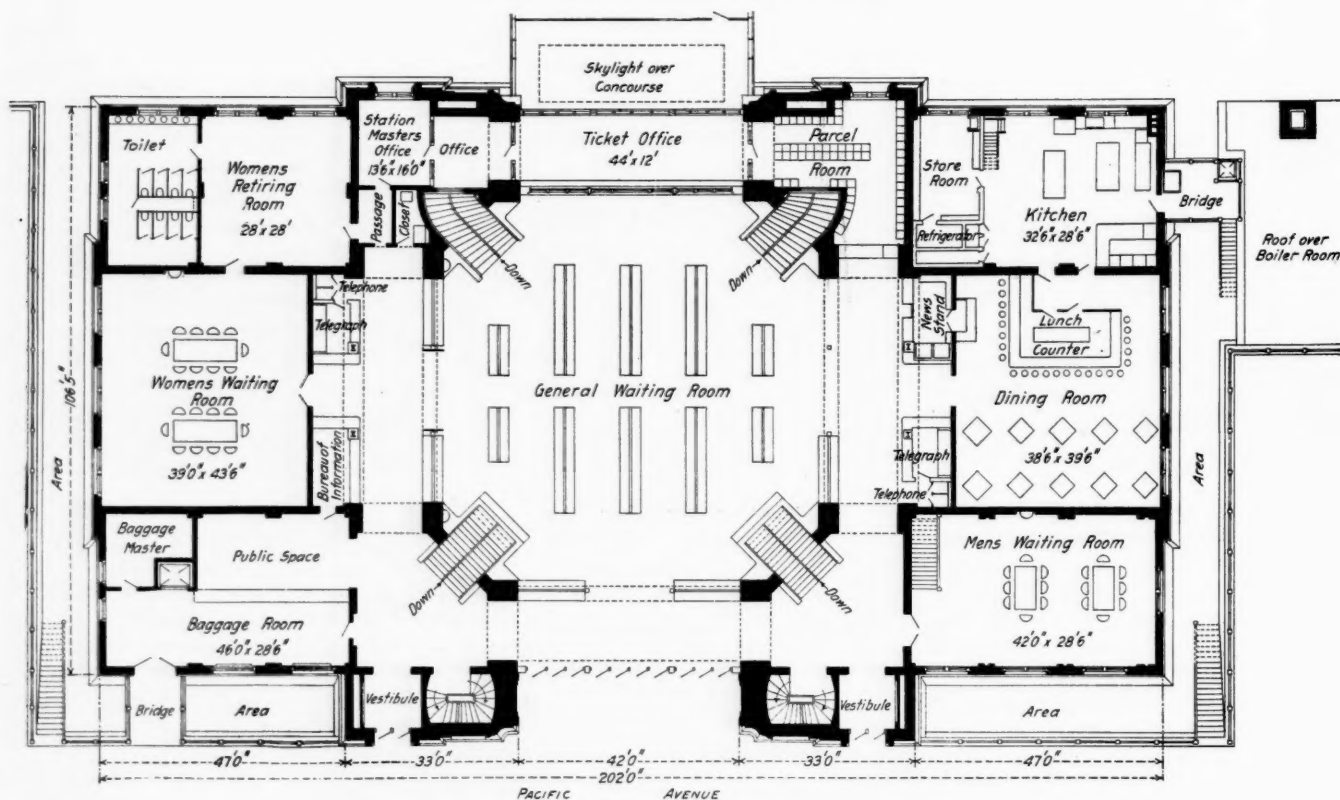
RAILWAY TARIFFS, THEIR COMPILATION, FILING AND INSPECTION.

BY G. C. WHITE.

A corps of practical tariff experts, selected by the Interstate Commerce Commission from the traffic departments of various lines, is now, with the authority of the commission, directing the movement for tariff uniformity. We are still far



Track Level; Tacoma Passenger Station.



Waiting Room Level; Tacoma Passenger Station.

floor beneath on the track level is given over to the handling and storage of baggage.

The building is about 200 ft. x 106 ft. and constructed entirely of steel and concrete in its interior portions, with brick and stone walls above the street line and concrete below.

The production of the Japanese government steel foundry for the last financial year is roughly estimated at about 100,000 tons, of which the more important items are 20,000 tons of steel plates, 25,000 tons of rails, 7,000 tons of steel bars, 3,600 tons of angles, 5,000 tons each of flat and pig steels, and 2,500 tons of nickel-plated steel plates. Of the total production, over

from the ideal. There are problems yet to be solved and conflicting interests to be harmonized. Any discussion of the question, to do full justice to its broadest aspects, must take account not only of local and general office files, but also must deal with certain features of compilation and numbering of tariffs as well as the physical apparatus for taking care of them.

It is the local office, and especially the one-man station, that has in the past given most trouble and to-day needs most assistance. The true tariff inspector must be a close and accurate student of men and conditions as well as of tariffs. He should be a man of discriminating judgment, familiar with

the law and the commission's rulings, as well as the interpretations of his own legal department. He should be acquainted with traffic movements in the territory assigned to him and thoroughly familiar with all its tariffs. If possible, he should have had experience in the compilation of tariffs, in claim work, in handling a quotation desk in the general freight office, in revising in the auditing department, and in revising and billing in a local station. He will not content himself with merely checking an agent's files against a list prepared by somebody at headquarters. His title should rather be that of tariff instructor. Any system that burdens him with too much territory or limits the time he may spend at a station will fall short of the actual needs.

We have in the past given the local agent neither facilities for filing nor personal assistance in filing and handling his tariffs. We have sent him all that he needed (perhaps), and at the same time have loaded him up with quantities of junk that he did not need and could not use. He never saw a list of the tariffs that were in effect and that should be on file at his station. We have overwhelmed and bewildered him with quantity. He kept it all (probably in a barrel) and used little or none. He sometimes frankly said that he knew nothing about tariffs and did not want to know anything about them. He collected undercharges when he could, and when he couldn't we relieved his accounts or too frequently bluffed him into paying them himself. The shipper's equal responsibility with the carrier under the law has made the collection of undercharges easier, while the agent has learned to invoke the same law in calling the bluff when we ask him to stand for one.

We are learning in the general freight office that the mailing department cannot consist of a supply of tariffs, a station list, and an office boy. It must be supervised by the most competent tariff man to be had. A liberal use of the card index and a lining up of the mailing list so that each agent shall receive what he needs, neither more nor less, puts the mailing clerk's duties on an intelligent basis. The agent is meeting us half-way, admitting his shortcomings, and asking for help. When we check his files for the first time now and suggest that he should have written for further information on this point, or should have made a suggestion to the general office on that, he replies, "I used to do that, but they didn't even acknowledge receipt of my letters, and I quit." This is a sad commentary on the relations between the local agent and the tariff department. Between no two branches of the service is there greater need of intelligent co-operation. The tariff inspector has the opportunity to bring this about.

When we come to consider how extensive shall be the file of any station, the minimum requirements have already been fixed by the commission. We must place on file all tariffs naming rates from, to, and at that station. It is frequently true that many stations do not need all of the minimum requirement, considering the actual traffic handled, but legally we cannot go below it. The maximum must necessarily be a variable quantity, dependent upon local traffic conditions. Here the small line has an advantage over the big system in that the tariff inspector probably also supervises the general office file and the mailing list. To limit every local station to the minimum requirements of the commission is a short-sighted policy. Nothing so favorably impresses the shipper as an agent's ability to quote him rates correctly and promptly. Many of them are combinations of locals, and agents should be furnished a reasonable supply of other lines' tariffs beyond the minimum requirements. Even telegraph service is slow when the busy man wants a rate. If he cannot get it at once, no amount of explanation will relieve him of the idea that the local agent is incompetent or that the traffic department is lacking in good judgment. And it is the idea, not its basis of fact, that loses the business to the competing line. Therefore, in determining the maximum extent of a local file, in the case of a tariff rarely needed, it becomes a question of whether

it is cheaper to wire for an occasional rate or to secure and maintain a file of the tariff. The guiding principle should be, "Too few beyond the minimum, rather than too many."

That man in the traffic department who supervises the details of the files must possess to an eminent degree all the qualities outlined above for the successful tariff inspector. One road is called to mind that instructs agents and inspectors to remove from the files and destroy supplements and tariffs as fast as they are canceled. Such a policy would seem to have originated with a man whose sole experience had been on a quotation desk and who was a stranger to claims and corrections. Aside from these two there are many reasons why an agent's canceled files should be preserved. Whatever apparatus is furnished him for taking care of his live working file he should have a special case for taking care of his canceled tariffs and supplements so long as there is any probability of his having to refer to them. Even when this probability ceases to exist there is no necessity calling for their destruction. In addition to holding canceled issues such a case could be utilized for taking care of tariffs too bulky to be placed in the binders or racks.

There are many filing devices on the market. Probably the two most prominent are the binders in use on the Harriman lines, and the Cook system. Each has merits of a peculiarly high order, and each is at the same time open to some criticism. The Cook system has the advantage of maximum flexibility, approaching that of the card index. It provides an excellent method of filing for a quotation desk where canceled supplements and tariffs are not needed, and can be removed from the manila covers as fast as they are dead. But to the evercharge man in the claim department, to the revising clerk in the auditing department, and to the local agent it presents some complications. Neither of them can dispense with canceled supplements and tariffs. In large publications they will accumulate too rapidly to be kept all together in the manila cover. It is true that the cabinet is provided with drawers for this purpose, but in the rapid accumulation of canceled supplements and tariffs we are still confronted with the problem of a convenient and systematic method of filing them in a certain order that shall always remain undisturbed. And as the local agent has only the racks, without the cabinet he is still further handicapped.

Another objection to the Cook system is the fact that lack of space forbids the use of one rack for one tariff. When it comes to thin publications of only a few pages, several of them must be placed in the same cover. This necessarily at times brings in the principle of filing by sizes, directly violative both of the numerical and of the commodity principle.

The binders, on the other hand, do not permit in the highest degree that flexibility necessary to a growing and changing file. This is especially felt by the local agent, because we strictly limit his supply of them. Furthermore, their use necessitates a certain amount of mutilation of tariffs in punching them. This difficulty would be overcome if the commission should permit a width of 9 in., and if the roads would restrict the printed page to its present dimensions and utilize the additional inch for punching. Also, if they are not more than half full, constant opening and closing has a tendency to mutilate the bound edges of the tariffs.

In this discussion of the two systems no comparison is made with reference to cost of installation and maintenance. Whatever the difference it is not sufficiently great to be the decisive factor, and the one that best meets the needs should be installed, regardless of comparative costs. We may one day combine the two systems, utilizing the racks for the live, working file and the binders for canceled issues.

In regard to the order of arranging the various tariffs, no attempt will be made to discuss or criticize to any great extent different methods in vogue. What is said will rather be a presentation of the writer's method of filing, using the "Perfect" binder, and of what he has accomplished in devising

a system for taking care of a general office file of about three thousand tariffs and station files at about seventy-five stations. It is readily conceded that this is not a very formidable file, but it may be remarked in passing that it includes five distinct territorial groups, each having its own peculiar rate conditions, and two of them being unusually difficult for a rate man to handle.

The fundamental feature of the method is acquaintance with the individual tariff and the territory covered by it. Reliance on memory to locate a tariff is reduced to the minimum. Its keynote is the ability to count and a knowledge of the alphabet. All tariffs are arranged alphabetically by issuing roads and numerically (using the road number and not the I. C. C. number) by the tariffs of each road. Filing by commodities is eliminated as inconsistent, not to say impossible. The commodity plan would be ideal if each tariff covered only one commodity. Since the majority of them cover more than one, when we impress upon an agent that they are all filed by commodities, he is too prone to look under the W's for a rate on wool or the G's for a rate on guano, and then wire the general freight office instead of trying to cultivate a close acquaintance with each individual tariff.

The commodity plan leads to the absurdity practiced by some roads, under the guise of a cross index, of inserting cards here and there, carrying in effect the information that tariff so-and-so that ought to be here is somewhere else. There is only one place for a tariff. The plan is inconsistent for the further reason that in the case of a tariff covering four or five prominent commodities, some one must determine which is the most prominent. This rests with the man in the general freight office. Hides might seem to him the most prominent, either from his own personal view or from the standpoint of the line's total tonnage. On the other hand, honey might be most prominent for one station, salt for another and agricultural implements for a third. It cannot be left to the individual agent if uniformity is to be maintained, and uniformity is absolutely essential to the success of any system of tariff filing. Escape from this dilemma is usually sought by filing under the subhead of "General Commodities." The result is confusion worse confounded. From segregation we get back to congregation.

It is maintained, therefore, that the only logical and consistent system of filing is alphabetically by roads and numerically by tariffs of each issuing road. An agent begins the use of such a file, relieved of the idea that there is a convenient thumb rule that will infallibly locate any rate on a certain commodity between any two stations. We appeal to his initiative and intelligence in locating what is wanted rather than imply a lack of intelligence by assuming to point out the obvious.

It is not necessary to memorize by number all the tariffs of any one road. Still less is it necessary to try to carry in mind all the commodities of any one tariff. As a help at the outset in locating them, a typewritten index by volumes, listing the tariffs in the order of their filing, is good for the local station. It is easier to remember two things than one, however slight the connection between them. Let the agent or rate clerk form the habit of associating a certain tariff number with a certain territory. From associating one number and territory he gradually gets fixed in mind consecutive numbers and territories. With one commodity in a tariff he readily associates the other commodities in the same tariff. It then becomes a question of a very short time when the index is no longer a constant necessity. With a little practice the exact value, tariff, page and item number can be located instantly. He comes to know his tariffs as he knows his friends—by constant association with them.

Segregate your tariffs alphabetically by issuing roads and assign one or more serial numbers to each road. The number necessary to assign will depend on how many tariffs of each road's issue are kept on file. The total number of series may

be fixed at 100, 1,000 or 10,000. To illustrate the elasticity of the system, suppose that 10,000 is the number selected. The different volumes of a series will be numbered consecutively in addition to carrying the serial number. The first volume of Series I would be numbered 00001-1 and the fifteenth volume of series 423 00423-15. It would probably be better to place the volume number underneath the serial number. At any rate the entire five figures should appear in the serial number so as to avoid confusing serial with volume numbers.

Consecutive letters could be used to designate the various volumes, except that we run aground on the twenty-seventh. And besides, we could not look at the last volume and tell at once the total number in any series without counting the letters of the alphabet.

We cannot number the volumes consecutively as they are brought into use. Suppose we begin to put the Western Classification in Volume 10. By the time we have filled the volume tariffs. We naturally want to keep all tariffs of the same kind we have used, let us say, the next 130 volumes for other or group as near together as possible. We are, therefore, confronted with the problem of either placing Volumes 10 and 131 side by side or of relabeling 11 to read 132, with the consequent disarrangement of the alphabetical scheme.

In filling the volume, turn to the back and put in the lowest numbered tariff. On top of the body of the tariff place all live supplements in numerical order, the highest, or latest, on top. Underneath place the canceled supplements in the same order. If the tariff has a division sheet, place it underneath the tariff and canceled supplements, observing the same relative order of arrangement of canceled and live supplements with respect to the body of the division sheet. Select the next higher numbered tariff and file in the same way together with its division sheet. In consulting a tariff we thus have all the latest changes in the newest supplement brought first to view and attention in turning through the volume as we would an ordinary book. Under any one road the tariff is the unit. The idea then of arranging them so that the highest numbered one is first seen on opening the volume is merely an expansion of the principle governing the filing of the individual tariff and its supplements. And no competent rate man will criticize the arrangement outlined for the individual tariff.

The heavy, full-page manila sheets, which for convenience we shall call the separators, are not very well adapted to this system. The typewritten index at the front of the volume for the local office file and the card index for the general office eliminates the necessity of using their projecting edges as an index. The fact that they project beyond all three exposed edges of the tariff interferes with a rapid turning of the leaves. It is better to cut them down to 7 x 9 in., punching the 7-in. side. They then serve their true purpose as separators only, defining the limit of each tariff. The number of separators required will depend upon the tastes and needs of the rate man as well as the bulk of the tariffs. Speaking generally there should be one for each tariff or division sheet.

A division sheet applying to only one tariff should be filed with that tariff. General division sheets and percentage bases, applying to more than one tariff or to certain roads or territories, should be grouped together under one or more serial numbers. Classifications should be treated similarly.

When a new supplement comes in place the canceled one underneath the body of the tariff so as always to preserve the live matter "first out." When the tariff is reissued replace the body of the canceled issue underneath Supplement No. 1, preserving the entire tariff with its supplements in chronological order of issue.

The ideal of this system is reached in the case of a comparatively bulky issue followed by frequent supplements. Take, for example, Southwestern Lines' No. 3, rates to Rio Grande Crossings. Suppose Series 00061 has been assigned to it. We begin with Volume 00061-1. When supplements and reissues have filled this we pass naturally to Volume 00061-2,

and so on. If this is a tariff we need frequently to consult for current rates, for handling old claims, or for tracing the history and development of some rate; we thus come in the course of time to possess a complete, well-preserved, chronological file of it. Canceled issues may be kept in the volumes or, when we rarely ever have to refer to the earlier volumes, the contents may be removed and bound on heavy tar board with a title page carrying the original volume reference.

In assigning serial numbers for the tariffs of any road, figure well in advance the probable maximum number of that road's issues that will ever be in the files at one time and allow a liberal margin beyond the probable. If there are 200 Santa Fe tariffs, allow 250 serial numbers for that road. Let us suppose that the numbers assigned run from 04251 to 04500. If in the beginning we have five volumes comfortably full, one-fifth of them can be put in Series 04251, one-fifth in Series 04301, and so on, skipping fifty numbers each time. In the course of time Volume 04251-1 gets too full. Remove the half of them carrying the highest numbers and transfer to Volume 04276-1. As new supplements and reissues appear repeat this process. Ultimately it resolves itself into one serial number for each tariff. If the lowest numbered tariff in Volume 04251-1 is Santa Fe 258 C, we then have Volumes 04251-1, 04251-2, etc., containing a complete chronological file of 258 C, 258 D, etc.

It is not to be supposed that all the serial numbers assigned to any road will ever be in use at one time. If they should be, expansion without complication would be at an end. The natural growth and development of a road's body of tariffs, together with the changing needs of the line filing them, is an automatic check against over expansion. One tariff may be canceled outright or merged with another. A second may be kept merely for reference, and comparison may be destroyed when the superseding issue appears. Others to which the filing line may be a party and under which it is daily handling business may be destroyed in the course of five or ten years when there is no longer occasion to refer to them. Our own issues should never be destroyed. A complete file should be kept in perpetuity for historical reasons, if for no other.

The plan presents some difficulties, but they are by no means insuperable. The complications arising are not so numerous as those presented in handling a large correspondence file. It will take brains, patience and hard work to keep up such a tariff file, but these are necessary to the execution of anything worth doing. Their choice of a profession is evidence that our agents and rate clerks have brains, and the most prejudiced will not deny their willingness nor their patience in the face of hard work. The trouble has been due partly to elimination of personal contact. The agent had responsibility without sufficient authority, and too often had to combat a presumption of negligence. And men have a tendency to live up to the reputation imputed to them.

After serial numbers have been assigned and the tariffs filed, the question then is some simple index that will assist in locating them. We always know either the issuing road and number of a tariff or the commodity and territory. Consequently, if we card-index each tariff twice, there is no chance of losing it. On the first card show the following information:

Initial of issuing road	Name of commodity covered
Road number	Date effective
	I. C. C. number
	Territory covered

Volume No.

On the second card show this:

Name of commodity covered	Initial of issuing road
Road number	Date effective
	I. C. C. number
	Territory covered

Volume No.

The I. C. C. number would not be necessary but for the fact that some roads duplicate their numbers. Insert the volume number with pencil so that it can be readily changed in case a tariff is moved to a different volume. In the case of coal and coke, grain and hay, and similarly closely related commodities

both should be specified so as to reduce to a minimum the number of tariffs described as "Commodity," reserving this term for those covering more than two dissociated commodities. All ore tariffs should be indexed under O, though it would be a further help to write "Ore-graphite," "Ore-zinc," etc.

Put the first set of cards in a case labeled "Live, by roads"; the second set in a case labeled "Live, by commodities." Arrange the first set alphabetically by roads and numerically under each road. Arrange the second set alphabetically by commodities, segregating by roads under each commodity and arranging the issues of each road in numerical order. Leading guide cards will show commodities, subordinate ones road initials.

When a tariff is canceled insert on the lower right-hand corner of the road card the road initials and number of the superseding issue. Transfer the card to a case labeled "Dead byroads." Remove the corresponding commodity card and use the back of it for another record, after which it may be destroyed, a dead commodity index being of no service. By recording on the cards superseding issues we get a forward chain of reference, the tariffs themselves affording a backward chain.

For the man who is studiously inclined and wants to know at the close of each day's filing how many tariffs he has the following record is suggested: Date—Live tariffs indexed—Dead tariffs indexed—Changed from live to dead file—Destroyed—Total live—Total dead—Grand total.

One of the drawbacks to uniform filing in the past has been the inconsistencies of numbering and designating tariff publications. Some roads annually issued a line of tariffs expiring December 31. Each reissue was given an independent set of numbers. As a result No. 5 of this year might cancel No. 97 of last year, and that in turn No. 42 of the year before. Some started one series of local freight tariffs, another of joint freight tariffs, another of classification exceptions, etc. Nearly all had a series of circular letters embracing such widely divergent topics as temporary embargoes, I. C. C. rulings, or the fact that John Smith's sack of potatoes had been lost in transit. Some still precede all freight tariff numbers by the letters G. F. D. or G. F. O. This apparently originated on a line whose traffic head handled both freight and passenger matters. We boast of American originality in railroading and are slaves to precedents whose day of usefulness is past. No one has ever supposed that the motive power department issued tariffs. Then why incorporate a statement on the title page that it comes from the traffic department when we show it issued by the head of that department over his official title?

Strictly speaking, a list of classification exceptions or a body of rules governing the handling of explosives is not a tariff, nor is it a schedule, as the term is used by the commission. The word "publication" would embrace every character of issue, but it is cumbersome and unusual. Let us extend the application of the word "tariff" to cover everything published by the traffic department and filed with the Interstate Commerce Commission, assuming that the line is located within a territory. Let such publications be carried in one series of numbers. The first issued is No. 1, regardless of its description, and the second is No. 2, etc. Reissues should be designated by the same number with a letter suffix, as 3 A, 3 B, etc., rather than the next consecutive unused number. We get accustomed to a certain number being associated with a certain territory, and the work of the rate man is thus facilitated both in handling live files and in taking care of dead ones. Under such a system correspondence, especially by wire, is relieved of one of its principal burdens. There are no duplicate numbers. Reference to a tariff is by issuing road and number. It is not necessary to add the I. C. C. number, a description of the tariff, the territory covered by it, or the date effective to avoid the possibility of error.

So far as traffic circular letters are concerned, they should be confined to the narrowest possible limits, both as to subject

matter and the number issued. They should contain instructions of a permanent character. Things of a transitory nature should be carried under a correspondence file and so distributed. If one agent is out of line on some point, tell him so by letter, but do not rush into print with a formal complaint against ninety-nine others who are blameless. Don't reiterate tariff provisions in circular letters. As a general rule reissue them rather than amend by supplements. In doing so it would probably be better to take the next unused number instead of the same number with letter suffix.

Some roads at the present time carry everything in one series of numbers, whether filed with the commission or not. This is not a bad idea, but the point emphasized is that there should not be more than two series.

The practice of some roads of assigning their numbers to joint tariffs issued by other roads and of filing and quoting by their own numbers seems open to grave criticism. One road is called to mind that even assigns its own number to publications to which it is not a party and which it distributes to its agents as a matter of information. The practice may have advantages, but its inconsistencies are more obvious. Take, for example, Fort Worth & Denver Live Stock Tariff 872 C, to which some ten or twelve lines were parties. Have we not reached the height of inconsistency, not to say absurdity, when we write a connecting line referring to it by our number and receive a reply in which they refer to it by their number? We might as well change an employee's name each time we change his work or location. The issuing road's number of a tariff is its only perfect means of identification. Aliases should not be tolerated here any more than in the personal records.

It is certain that while we are recording another line's tariff under our own number we must take some record of the issuing line's number or its identity is lost altogether. Then why add unnecessary work by forcing a rate man to keep track of a dozen numbers for one tariff when one number is sufficient? It would be just as logical for every line using the Western Classification to assign its own number and refer to it by that number.

It was formerly the custom to show on the title page of every joint tariff the number assigned to it by each line party thereto. We are wisely getting away from that. Nor is there any good reason why, even for our own records, we should assign one number to a tariff of our own issue and the next number to a foreign issue, thus breaking the logical continuity of the series. A loose leaf tariff register, arranged numerically by our issuing number, showing: Road No., I. C. C. No., Road initial, Date effective, Territory covered, Authority file and Stations where filed, would meet all the requirements of our own issue. For foreign issues, to which our line is a party, a separate register should be kept, the first column showing Concurrence Form and No., the remaining columns being the same as for home issues. The leaves of this register should be arranged numerically by sections corresponding to the various concurrence forms. Each section should be arranged alphabetically by roads and numerically by tariffs of issuing roads. The principle of the "commodity" card in the card index could be extended to cover all the information required by the commission in the Tariff Index and the arrangement made to conform to that outlined by the commission. (However, in passing it may be remarked that the commission's requirements in this particular are still some distance from the goal of logical consistency.) The issuance of supplements to the Tariff Index and its reissue would thus become a matter of ease and simplicity.

When Secretary Knox's views on certain constitutional points affecting the relations between intrastate and interstate commerce have received decisional recognition by the Federal Supreme Court, when the state commissions have ceased to exist, and when everything is filed at Washington, tariff numbering will have attained the maximum of uniformity. Each

publication will bear only one number, which will be both the road number and the commission number—without the prefix "I. C. C."

The above is based on an experience confined almost exclusively to freight tariffs. Some points of difference in the passenger department may require different treatment, but the basic principle is the same. Even a casual examination of a large body of passenger issues makes it clear that there is an even broader field of endeavor here and greater need of uniformity.

Economy of time and labor is the ultimate object of any plan of uniformity. Every body of rules and regulations incorporated in a tariff should be carefully segregated into paragraphs, each containing what logically belongs together. Each paragraph should have a subhead and the whole should be arranged alphabetically by subheads. Many a misquotation has been due to an agent having to read several pages of closely printed matter without break of paragraph or subhead. There should be one fixed order of Item number, Commodity, From, To, and Rate.

Eliminate everything superfluous. Why preface a schedule of rates with the statement that they are specific? If they are they show for themselves; if they are not, the statement that they are does not make them so. Again, why print on a tariff, "Mailed I. C. C. such and such a date"? If it reaches the commission in time it is legal, otherwise it is rejected, and a record of the office temperature on the day mailed would have just as much bearing on the question of legality.

Ships and armament count for little without men behind the guns. An assistant general freight agent of a big system recently made the statement that there was no one in his tariff bureau to whom all the data for a tariff could be given with the feeling of assurance that the tariff would appear in due time and proper form without constant supervision from tariff officials and the head of the bureau. Too much supervision is worse than too little. It destroys initiative and originality.

The tariff compiler should be a practical rate man, of liberal education, able to handle the English language and to say in the fewest words possible just exactly what he intends, neither more nor less, not so that it may possibly be understood, but so that it cannot possibly be misunderstood. He is drafting the laws of the land and on his skill depends the road's revenues.

Prior to 1887 the Association of American Railway Accounting Officers had recognized the need of uniformity in accounting and had adopted measures that formed the basis of the commission's requirements. The same opportunity presented itself to the American Association of Freight Traffic Officers and the American Association of General Passenger and Ticket Agents in the matter of tariff uniformity. They failed to act. As a result when the commission came to prescribe the details of tariff publication and filing it found little to serve as a basis for its own action. It is true that the statistician of the commission had some years before worked out a plan looking toward future action by the commission, but in practical application some of its details were found imperfect and defective. Had the roads taken the matter in hand and by concerted action devised a system of tariff uniformity, the work would probably not have been so rapidly, not to say radically, done. They would, however, have had a working basis to put before the commission, they would have avoided the enormous expense of a wholesale reissue of tariffs that failed to meet the requirements of the commission, and they would have saved the losses of revenue occasioned by hasty work in the reissue. Much of their best talent is now in government service, where, freed from the practical requirements of the general freight office, the tendency is toward the theoretical. Initiative on the part of the traffic associations and co-operation with the commission will counterbalance this tendency and perfect a system meeting the requirements both of the roads and the government.

TELEPHONE TRAIN DESPATCHING ON THE SANTA FE.

The Atchison, Topeka & Santa Fe has about 1,100 miles of telephone train despatching circuits in operation and about 1,200 miles additional under construction. We recently asked C. H. Gaunt, assistant general manager and superintendent of telegraph, concerning the success of their telephone despatching system after more than a year of service. His reply is given below in full:

The initial use upon the Santa Fe lines of the telephone for train operation was in June, 1908, when a 93.8 — mile, newly built branch line between Holly and Swink, with 12 offices, in the beet sugar district of Colorado, was so equipped. At that time the calling selectors at present in use had not been perfected and recourse was had to the then standard bridging bell and hand generator, offices being signalled by a combination of rings. This equipment has been in continuous successful use upon that branch for all purposes of wire communication since the above date, no telegraph line ever having been installed.

After six months practical trial upon this circuit of the use of the telephone exclusively for train despatching, construction work was begun upon 2,182.5 miles of telephone despatching circuits, the tabulation below showing the present status of this work:

Districts Under Telephone Operation.		
Date installed.		Mileage.
June 1908.	Holly, Colo., to Swink, Colo.	93.8
Dec. 19, 1908.	Newton, Kan., to Emporia, Kan.	74.8
Feb. 28, 1909.	Emporia, Kan., to Kansas City, Mo. (via Topeka)	128.0
Apr. 2, 1909.	Joliet, Ill., to Pequot, Ill.	20.2
May 17, 1909.	Camden Jct., Mo., to Carrollton Jct., Mo.	29.5
July 9, 1909.	Clovis, N. Mex., to Vaughn, N. Mex.	130.9
July 15, 1909.	Bakersfield, Cal., to Ferry Point, Cal., including Oakland, Visalia & Oakdale branches	390.8
July 23, 1909.	Emporia, Kan., to Kansas City, Mo. (via Cutoff)	112.8
July 26, 1909.	Vaughn, N. Mex., to Belden, N. Mex.	109.2
Total		1,090.0
Lines Under Construction.		
Construction commenced.		Mileage.
Mar. 6, 1909.	Chicago, Ill., to Kansas City, Mo.	458.4
May 1, 1909.	Gainesville, Tex., to Temple, Tex.	192.5
July 14, 1909.	Wellington, Kan., to Clovis, N. Mex.	416.8
July 28, 1909.	Denver, Colo., to Pueblo, Colo.	118.6
Total		1,186.3
Grand total		2,276.3

All circuits thus far constructed, with the exception of that from Holly to Swink, consist of two hard-drawn copper wires, weighing each 210 lbs. per mile, equipped with the latest type bridging telephone apparatus and calling selectors in about equal proportions of the two distinctive types operating upon the synchronized clock and the step-by-step principles. While some minor defects presented themselves in the early models of both types, these have been practically eliminated, the selectors now furnished by the various concerns operating practically without failure of the mechanical or electrical parts, and affording the despatcher facilities for promptly and surely calling one or more offices, not only during intervals when speech is not being transmitted, but simultaneously with such transmission, further giving this officer such control of the bell at the station called as enables him to know with certainty that it has been rung, to permit its ringing for any certain period and to stop it at pleasure.

The telephonic transmission over the line of greatest length, Fresno to San Francisco and branches, 203.1 miles, with 32 stations bridged across the line, leaves practically nothing to be desired, either in volume of sound or clearness of articulation.

The line failures, by superior construction, have been reduced to a minimum and the curious fact has developed that during heavy fogs in the San Francisco bay vicinity it is possible successfully to operate the telephone circuits after line escapes due to this moisture have rendered the telegraph wires partially inoperative.

Upon the score of safety and the criticisms which from time

to time find their way into the public press emanating from misguided and uninformed sources and finding support and perpetuation in the expressions of unionized Morse telegraphers and their leaders, totally without foundation in theory or justification in the light of actual experience or accomplished fact, I can do no better than to quote below one of many inquiries received at this office and the reply thereto:

"Mr. C. H. Gaunt,

"Asst. General Manager & Supt. Telegraph, A. T. & S. F. Ry. Co., Topeka, Kan.

"Dear Sir: In the report of President Perham, of the Order of Railroad Telegraphers, which he read at a meeting in Atlanta, Ga., in the month of May, 1909, a stringent criticism of the use of the telephone in train movement appears, and the assertion is made that the use of the telephone is responsible for numerous accidents. Would you have any objection to telling me whether your use of the telephone has resulted in any accident that can be absolutely charged to the telephone?

"Very truly yours,

"_____"

"Topeka, Kansas, July 30, 1909.

"Dear Sir: Replying to yours of the 19th: we have under process of construction 2,276.3 miles of telephone train despatching, 1,090 miles of which is now in operation. Our first circuit was installed June, 1908, and we have added circuits as fast as it has been possible to obtain the apparatus.

"Answering your query prompted by the criticism of President Perham, of the O. R. T.: the telephone despatching has been in no way responsible for any accident in any territory so equipped. I may add further, that in no instance have we gone back to the telegraph despatching after once starting the telephone circuit, except, of course, temporarily, for very short periods of time during wire trouble on the telephone pair. This we expect to overcome by stringing parallel circuits for the handling of messages. This second circuit will, of course, be available as a spare despatching circuit.

"Yours truly,

"C. H. GAUNT."

The appreciation and enthusiastic acceptance of these telephone facilities by despatchers are best expressed in many letters received from various despatching points, two of which I am quoting below:

"Emporia, April 3, 1909.

"Mr. L. Stanley,

"Trainmaster, Emporia.

"Dear Sir: I attach herewith letters from Night Chief Despatcher Messick and Despatchers Baker, Lindsey, Moore and Extra Despatcher Patterson, who have handled trains by telephone. You will notice that they are all agreed that the method of handling trains by telephone is vastly superior to the old method of handling them by telegraph.

"(1) The telephone has done away entirely with the loss and waste of train despatchers' time calling operators, which time can now be put to good advantage in keeping up the train sheet, calculating ahead, and tends to better handling of train movement from the fact that the train despatcher has more time at his disposal in which to arrange for the meeting and passing points. This feature also secures to the despatcher the placing of the orders to the trains at the time he originally outlines and figured on by him.

"Under the old method or plan, if for any reason it would be necessary for a despatcher to spend ten, fifteen or more minutes endeavoring to raise some certain office, the despatcher would, of a necessity, be crowded for valuable time, which would always result in bringing him face to face with a congestion of train orders to handle; in other words, the despatcher would want to issue two or three orders at the same time on account of his work being delayed by failure to raise an operator. So far the experience with the telephone has shown that this feature has been entirely eliminated.

"(2) I believe that there is no argument between the two methods as to safety. The telephone is perfectly clear and reliable, and with the instructions pertaining to the handling of train orders and checking there should be no loophole for an error, and in case one might be made there is no reason why it should not be more easily detected than with the telegraph.

"No claim is being made that the actual transmission and repeating of train orders is being handled quicker on the telephone than by the telegraph, but the officers to which the orders are to be sent or handled are assembled without loss of time, which is a decided advantage over the telegraph.

"There is one feature of the handling of train orders under the telephone that should recommend itself to every trick despatcher, as well as the railway company, and that is that the train despatcher now places in his record book a copy of the order as he transmits it instead of waiting for the first station to repeat it and take chances of his memory verifying the order as being the same as was sent by him.

"(3) Under the old method, when a train despatcher would have a great number of orders to issue and repeat, 'OS' reports or time of trains at stations would be neglected and a great deal of delay would ensue raising offices and requesting this information. With the telephone you can get this information as quickly as the selector will ring an office.

"(4) Under the telegraph system it was formerly quite a task to secure, within a reasonable length of time, any satisfactory information in case of derailment or other trouble. With the telephone the entire situation is covered in a few moments' time by getting the conductor or party who would be in touch with the situation to advise just what this might be. Any point that would not be covered could be requested; while under the old method, message after message used to be sent before results could be obtained.

"The advantages of train despatching by telephone are too numerous to enumerate and despatchers feel that we would be going "back to the light of other days" if we had to go back to transmitting our orders by telegraph. The despatchers are getting hearty co-operation from all operators and agents, and we are having success with this system. There has been, of course, some wire trouble and minor defects, all of which have been eliminated, and at the present time I would say that the telephone is working as perfectly in its way as did the old telegraph instruments, and have no doubt that if the improvement will be as marked in the future as it has been in the past two months the system will be entirely perfect in a very short time.

"Yours truly,
"H. MCPHEE,
"Chief Despatcher."

"Newton, December 29, 1908.

"Mr. D. D. Bailey,
"Chief Despatcher, Newton, Kan.

"Dear Sir: The most important advantage, to my mind, is the calling of operators who may be outside working local trains or handling freight in the freight house, which is almost impossible by telegraph.

"Operators respond quickly, and act quickly in giving instructions.

"There are no student operators, as some of our weakest men, telegraphically speaking, are strong on the 'phone.

"Ability to converse directly with conductor or engineer when desired.

"The making of a record of messages while sending them.

"In conversation the 'phone is much faster than the telegraph.

"Yours truly,
"H. C. ROEHRIG,
"Despatcher."

A few simple rules covering the use of the telephone train

despatching circuits which it was found necessary to issue to employees follow:

"(1) All numbers, including train, engine and time and the names of stations and conductors, will be first spelled then pronounced by the despatcher in sending and by the operators in repeating; the object in spelling first being that the operator cannot then assume that he understands the pronunciation and pay no further attention to the spelling.

"(2) Despatchers, at the time they are being sent, will write out in long hand all orders.

"(3) Operators, when desiring to call the despatcher, will take down the receiver and give the name of their station. If the despatcher is ready for them he will simply say 'despatcher.' It will happen frequently that two or three operators come in at the same time, each giving the name of their station before the despatcher has had time to answer. In such cases, when the despatcher is ready to reply, he will speak the name of the station he wants first, following it with the word 'despatcher.' This is to save any wrangling of the operators over the wire.

"(4) Operators should be instructed that they are not to ring the despatcher's bell except in cases of very important business and when the despatcher fails to respond in the usual manner. Further, that when offices are closed the telephone must be cut off the line with the switch provided for that purpose."

THE PRIVATE FREIGHT CAR AND DEMURRAGE.

The private car is a good deal of a mystery. In the first place nobody knows how many private cars there are on the Continent, the estimates varying from 100,000 to 200,000. Again, there is a marked difference of opinion as to just what a private car is—the railways having a definition, and the Interstate Commerce Commission having recently adopted another for a "privately owned car." The mystery is heightened by there being so many different kinds of private cars. The private car question differs markedly according as you consider private tank cars, private coal cars, private stock cars, private refrigerator cars, and the like.

It is not intended at this time to treat of the whole private car question, but simply its relation to the demurrage question, which is now being considered by the National Association of Railway Commissioners.

When the systematic enforcement of car demurrage rules began in the early eighties, there was no marked difference between the status of the foreign car and that of the private car, as both were paid for on the same mileage basis. There had never been any question that a railway, after allowing a reasonable time for loading or unloading, could collect demurrage on its own cars. It was early recognized that it could do the same with cars of foreign railways so long as they were in its possession, and could retain the money so collected, without regard to the ownership of the car. In like manner, it was recognized that it could do the same with cars owned by others than railway companies when they were in its possession. The American Railway Association early formulated a rule defining the act of interchange between railways; and under the Master Car Builders' agreement each railway undertook to look after the other's cars while upon its own tracks and upon all private sidings connected with them. Each railway practically undertook to return foreign cars in as good condition as it had received them, and this gave a mutual insurance which was absolutely complete.

In the case of private cars, no question arose when they were interchanged between railways, but questions did arise when they were delivered by railways to private tracks. It was recognized that a railway had possession of a private car on its own tracks and could collect demurrage when the consignee delayed it; but how about a private car on a private track? This question was generally settled by making a dis-

inction between private tracks owned by the private car owner, and private tracks owned by other people; and the private car was generally held to be subject to demurrage when it stood on the private tracks of parties other than the owner, but not subject to demurrage when it stood on the track of the owner. In construing this rule the word "owner" was used to cover not only a permanent ownership but a temporary ownership conferred by lease, and it generally was extended to include almost all forms of contract; so that when corporations owning car and track were of kindred ownership the car was exempt from demurrage.

It should be noted that at this point the demurrage phase parts company with the insurance phase covered by the Master Car Builders' agreement. Under this M. C. B. agreement, as noted above, a railway is responsible to the owner for a foreign car destroyed on any track connected with its system, even if it be a private track. In the case of private cars, however, a railway is not responsible to the owner if a private car on a private track is destroyed. The railway is responsible for the repair of a private car, just as it is of a foreign car, and is therefore responsible for any minor losses occurring on a private track. There is, however, another point of similarity between the private car and the foreign car, in the fact that the railway is bound to return the car to its owner, empty if necessary, but retaining the right to load it home.

Matters stood in about this situation when, in 1902, the American Railway Association adopted the per diem rules, and the railways approved the per diem agreement which went into effect on July 1st of that year. These rules included as a definition of a private car, "a car of other than railroad ownership," and among the per diem rules may be found Rule No. 16, reading—"These rules do not apply to private cars."

The rules have been criticized a great deal on this account, and it has been assumed that the private cars should have been included in the agreement; also that the per diem rate would have so reduced the earnings of private cars as to have practically wiped them out.

It will probably be sufficient to state that the exception was adopted for two reasons: First, there was plenty of opposition to the per diem rules, without unnecessarily antagonizing the owners of such private cars as were profiting by the mileage rates then in force. Second, it would have been a very difficult thing to exactly determine when a private car was at home and therefore not subject to the payment of the per diem rate. The broad definition of the word "owner" noted above would have created many difficulties, and so would the practice of holding private cars for prospective loading. In addition, it would have been necessary to define a private track. There has been so much controversy in the last two years over these points that it would seem the founders of the per diem system were justified in postponing this trouble.

The adoption of the per diem rules contributed immediately and forcibly to the enforcement of the demurrage rules; but the difference in the method of payment by the railways for the use of foreign cars and private cars was at once noted by the industries which owned or controlled private sidings, and they put up a plea that as the railway paid nothing for the use of private cars while they stood still, they should not be allowed to charge demurrage while the cars were so standing on private tracks. The owners of private coal cars, who claimed the use of their own cars and also their regular proportion of railway cars, were very much interested in drawing a line between private cars and railway cars, and so were the railways whose systems of car distribution allowed this distinction. Accordingly, one of the car demurrage bureaus adopted a rule exempting from demurrage all private cars on all private tracks; but all the other bureaus and all the state laws and commission rules held to the old exemption of private cars on the tracks of their owner.

When the Interstate Commerce Law was amended in 1906, the mysterious side of the case was helped along by the inclusion in the law of the following words: "The term trans-

portation shall include cars * * * irrespective of ownership or of any contract, express or implied, for the use thereof, * * * and it shall be the duty of every carrier * * * to provide and furnish such transportation upon reasonable request therefor."

Under this clause of the law the refrigerator car companies have ceased to deal direct with the shippers in the furnishing of cars and refrigeration, but act through the railways. Under this clause also a number of rulings have been made in regard to coal car distribution, but just how it applies to demurrage, if at all, is not yet settled.

The "Hepburn Act" did, however, result in the final vigorous enforcement of demurrage rules, which, under the law, are filed as tariffs with the Interstate Commerce Commission; and with such enforcement there has been some little further objection on the part of those owning and controlling private sidings, to the imposition of demurrage on private cars. In general, the owners of private cars approved of the imposition of demurrage charges when the cars were away from home, although the car owners who were also shippers preferred to let the railways do the fighting for them. There was one exception to this, however, the so called "independent" tank line owners, who demanded, and still demand, that their cars be absolutely exempt from demurrage on all sidings, on the plea that they are not common carriers and that their cars are not in the public service.

The Interstate Commerce Commission has delivered two leading opinions on this subject. In the Cudahy case, where a railway assigned the use of one of its tracks to the Cudahy company, the commission decided that Cudahy cars were subject to demurrage on this track because it belonged to the railway company. In a case brought by the independent tank line owners the commission gave a decision which did not uphold the contentions either of the tank line companies or of the railways. The commission in this opinion did not use the railway term "private cars," but decided that while "privately owned cars" must be subject to the same demurrage charges as other cars when on railway tracks, they were exempt from demurrage while on the tracks of the owner and on the "privately owned tracks" of other parties. The extent of the opinion, however, was greatly modified by the commission's definition of "privately owned cars." Such a car was defined as one "owned and used by an individual, firm or corporation for the transportation of the commodities which they produce or in which they deal."

The American Railway Association promptly accepted this decision of the Interstate Commerce Commission. It did not, however, desire to change its old definition of private cars in order to adopt the commission's phrase of "privately owned cars." It therefore changed its rules so as to exempt from demurrage "private cars on tracks of the owner or on privately owned tracks of consignor or consignee used for the transportation of commodities which the owners of the cars produce or in which they deal."

It would appear that the intent of the commission in framing this opinion was, to exempt from demurrage on private tracks all private cars which their owners had loaded, the idea of the commission being that the owners would have sufficient influence with the consignee, through their commercial connections, to secure a prompt return of the cars. In cases where the railway company allowed the public to load a private car to a consignee who had no commercial relations with the car owner, the commission felt that a demurrage rule was essential in order to secure prompt handling of the car.

The theory of this decision is correct, but in practice great difficulties arise, as the agent at the unloading point, who usually has to collect demurrage, has no positive information as to the original ownership of the commodity with which the car is loaded. Under the old rule he knew sufficiently well the ownership of the car and of the track to be able to decide which cars were to be exempted from the demurrage rules; but it is very difficult for him to decide whether or not

the commodity was originally owned by the owner of the car, especially when it originates at a distant point. Indeed, it has been very difficult for the higher officers of railways and the car demurrage managers to ascertain this in practice.

For this reason the railways, at the recent hearing on demurrage rules before the Sub-Committee of the National Association of Railway Commissioners, urged that the old rule be restored; and no objection was raised to this by the public or by the owners of private cars, excepting the independent tank lines, who put up their usual plea that their cars should be exempt from demurrage under all circumstances, as the public was in no way interested in them.*

As this opposition to the old rule comes from such a slim minority, it seems fair to hope that the rule will be restored. This old rule, as above noted, excepts from the operation of demurrage rules simply "private cars on tracks of the owner." There have been, however, certain arguments against the rule which were not urged at the hearing, which may have some attention.

In the first place, there is the argument, which is noted above, that the railways cannot, with justice, collect and retain demurrage on private cars for which they are paying nothing while standing on private tracks which the railways have not provided. There are several answers to this argument:

1. While the railway is not responsible for the absolute destruction of a car when it stands on a private track, it is responsible for minor losses which are more likely to occur when a car is unduly delayed. The railway, for instance, must replace stolen air-brake hose and brasses. Again, there have frequently been cases where railways have replaced cars destroyed on private tracks when the owner was unable to collect of the track-owner. With these responsibilities incumbent upon it, the railway should be able to impose demurrage rules—the only known method of securing prompt movement of cars.

2. The railway is obliged to return the car to the owner, and coupled with this is the privilege of loading the car home. If the private car owner is at liberty to hold the car indefinitely, he deprives the railway of this privilege, and it would seem only fair that the railway be allowed to enforce this privilege by the application of demurrage.

3. It is practically admitted that a demurrage system is of benefit to the public in general and to the car owners in particular. If any cars are exempted from the demurrage system, the benefit to the public is lessened so much. It has not been found practicable for individual car owners to collect demurrage on their cars when they are out of their own custody. It has been found practicable for railways to collect demurrage on cars on all sidings with which they connect. The amount of demurrage collected on private cars standing on private sidings is certainly much less than the cost to private car owners would be if they attempted to establish their own demurrage systems. It seems, therefore, fair and for the benefit of the public, to allow the railways to use their own established machinery to enforce the prompt movement of private cars standing on all tracks except those of the car owner.

There is also the plea that the car owner should have the right to give the consignee the privilege of holding his car indefinitely on the consignee's private track. It is argued that as the private car owner has the right to alienate his car, either by sale or lease, he should also have the right to make temporary transfers of custody from time to time without a formal lease, and thus allow certain consignees to hold cars

indefinitely on their tracks. In reply to this the commerce law is quoted as forbidding "undue or unreasonable preference or advantage" and "unjust discrimination"; and it is urged, with apparent justice, that if the railway should allow a car owner to give one consignee the free use of his cars, while another consignee is charged demurrage, the railway would be guilty of unjust discrimination. In one of the car demurrage associations an attempt was made to cover this point by providing that the car owner could file with the manager of the demurrage bureau a request, under which all of his cars on all private tracks should be free from demurrage, and it was assumed that there would be no undue or unreasonable preference or advantage under this rule. This, however, would seem to be an error. If the railway should charge Brown demurrage on Jones's cars when on Brown's siding, and did not charge Robinson demurrage on Smith's cars on Robinson's siding, it would seem that the railway would unjustly discriminate in favor of Robinson as against Brown, no matter what request was made by Smith. If this argument is sound we are forced back to the old rule as the only legal one.

Another objection to the rule is, that it gives an undue preference or advantage to car owners who own private sidings at more than one point. It is, of course, true that a car owner shipping freight in his own cars from a point where he has a private siding to another point where he has another private siding will not be subject to demurrage under this old rule; while another car owner shipping in his own cars from a point where he has a private siding to another point where he uses the railway's tracks, would be charged demurrage; and a third private car owner making shipments in his own cars between two points at which he had no private sidings, would be at a still greater disadvantage.

In reply to this it may be said that the law does not forbid all preference or advantage to shippers, but only "undue or unreasonable preference or advantage"; again, if a car owner provides himself with sidings at more than one point, a relief from demurrage on his cars while on those sidings is not an undue preference or advantage, but an advantage which is fairly due him on account of the expense he has been at in building the sidings. In the same way, the private car owner who owns no sidings at all, is at a disadvantage from a demurrage point of view, with private car owners who own one or more sidings, but it should not be urged that this advantage is something that the law should make up to him. The only way he can relieve himself of this disadvantage is to acquire one or more sidings.

Besides the formal objections detailed above, there is a complaint occasionally made by the private car owner that when demurrage is collected on his cars, it should be paid over to him in whole or in part. This complaint is usually made in a more or less informal way, and generally in connection with complaints as to the assessment of demurrage on other cars.

The answer to this complaint is the one noted above, that to conduct a demurrage system costs the railways far more than their collections of demurrage. It is true that most demurrage bureaus show that the collections of demurrage are greater than the actual expenditures of the bureaus, but the expenses of a demurrage bureau are a comparatively small part of the full expense of conducting a demurrage system. The expenses of the bureau do not cover the expense of records kept by the agents of the railways, or the expense of collection—done, as it is, chiefly by the railway agents and officers themselves. If the demurrage rate were larger there might be something in the claim that the private car owner should receive a proportion of the collections; but as long as the demurrage rate remains at one dollar, it is quite fair for the railways to retain the whole of the collections.

It is, then, to be hoped that the report of the Sub-Committee of the National Association of Railway Commissioners will include the railways' definition of a private car, and also the old private car demurrage rule.

*It is a little hard to understand even the logic of this plea. If the private tank cars are subject to the Act to Regulate Commerce they must stand in the same situation as other private cars when demurrage rules are established. If their cars are not subject to the act, it is hard to see what the railway commissions have to do with them. Nor is it clear why the independent tank lines desire to exempt their cars from demurrage, unless they wish thereby to indirectly cut prices and rates.

General News Section.

The Canadian Pacific is installing a telephone line for trains operating between Winnipeg and Fort William, 426 miles.

Northwestern University, Evanston, Ill., announces that it will establish a course in transportation in its school of commerce.

An attempt was made to hold up and rob a westbound Lackawanna freight train on the Hackensack meadows, New Jersey, August 21.

The New York State Department of Labor is preparing actions against a number of roads for alleged violations of the semi-monthly pay law.

During the 1909 fiscal year the Chicago, Burlington & Quincy carried, approximately, 20,000,000 persons without loss of life to a passenger.

The Massachusetts railway commissioners have assigned September 9 as the date when the petition of the Boston Holding Co. will be heard.

The British Board of Trade has published statistics showing that not a single passenger in the United Kingdom lost his life in a train accident during 1908.

The Missouri board of equalization has fixed the assessment of the steam railways in that state at \$122,014,197, an increase over the assessment of last year of \$6,156,783.

Severe rains are reported in the watershed of the Arkansas river in Colorado, and trains on the Colorado Midland, Denver & Rio Grande and other roads are being delayed by washouts.

All speed records between Chicago and St. Paul are said to have been broken on August 16 by a special train on the Chicago & Northwestern, which made the run of 409 miles in 444 minutes.

On August 18 the Arkansas Tax Commission filed its report, showing an increase of \$14,034,944 in the assessment of railway property in the state. The assessment of the Iron Mountain was increased over \$5,000,000.

W. C. Nixon, vice-president and general manager of the St. Louis & San Francisco, is quoted as saying that this road will run its first train into New Orleans over the tracks of the Louisiana Railway & Navigation Company on September 1. (See *Railroad Age Gazette*, August 6, page 251.)

The Portland *Oregonian* says that the Oregon Trunk Line, which is projected to be built up into the heart of the Oregon district, now bounded by the Oregon Short Line, Oregon Railroad & Navigation, Shasta route and Central Pacific, is controlled by John F. Stevens in the interest of James J. Hill.

In a letter to Chairman Knapp several weeks ago, A. B. Stickney, the retiring president of the Chicago Great Western, declares that rebates, instead of being stamped out by the enforcement of the new law, flourish now more than ever, although not paid directly. Mr. Stickney says they are made possible through the juggling of class and commodity rates; through claims for overcharge and by other means.

The Chicago, Rock Island & Pacific planted 1,200 black locust trees along the right of way near Flagler, Colo., during April, 1909, and out of that number it has been found that only 173 are now growing. This would seem to afford conclusive proof that trees for ties cannot be grown successfully at that point, but the trees are said to have been in poor condition when planted, which may account for a large proportion of the deaths.

On August 22 a Great Northern passenger train, bound from Grand Forks for Spokane, dropped through a burning bridge into a gulch, some 40 ft. below, without killing or fatally injuring any persons. The train had left Darts, a small mining hamlet, and approached the bridge, about which bush fires were burning. The engineer judged he could get across in safety, but the underpinning of the bridge had been so

weakened that it fell under the load. The train consisted of a locomotive, mail car, combination baggage and express car and several passenger coaches.

According to the *Wall Street Journal*, the exchange of Boston & Maine shares for those of the New York, New Haven & Hartford by the former controlling interests in the Boston & Maine has changed considerably the personnel of the largest stockholders in the New Haven road. By the figures at hand the Mutual Life Insurance Co. is now the largest stockholder in the New York, New Haven & Hartford, with 35,640 shares; then comes the American Express Co., 23,493; then the New York Central, 11,148; then Charles Pratt & Co., 10,463; then the Pennsylvania Railroad, 9,900, and the Standard Trust Co., of New York, trustee, 9,730.

Replying to inquiries by the government as to why the substitution of Mexican for American labor on the National Railways of Mexico has not gone on faster, E. N. Brown, president of the National Railways, and Pablo Macedo, vice-chairman and general counsel, have written long letters stating that every effort is being made to change the entire personnel of the system with a view to employing only Mexicans. The Spanish language is being used in the printing and correspondence over the roads wherever practicable. Two Mexican telegraph operators have been put in each despatcher's office, who are expected to become competent to succeed the American operators.

Data collected by the state labor commission of Oklahoma shows that railway employees in train service earn higher wages and save more on the average than any other workmen in Oklahoma. Conductors, engineers, firemen and brakemen work an average of 302½ days of 10 hours in a year, their average income is \$1,187.66 per year, and their average cost of living \$630. They save from their earnings and investments an average of \$437.50 per year or 40 per cent. of what they earn. Miscellaneous railway employees, including machinists, trackmen, boiler makers and car men work an average of 238 days in a year, receive an average income of \$685.38 and their average cost of living is \$497.30; their average savings are \$180.29 per year, or 22 per cent. of their income. The average earnings of carpenters, electricians, hod carriers, lathers, painters, plumbers and stone carriers, whose prosperity is second to that of railway trainmen, is \$791.46 per year and their average cost of living \$521.47.

Governor Hadley, of Missouri, has written a letter to Dr. A. H. Hamel, president of the state board of health, urging him to take up with the officers of the railways the question of better sanitation of passenger coaches. An assistant attorney-general of Missouri has rendered an opinion holding that the board of health cannot enforce any rules that it may prescribe. Governor Hadley says that regardless of whether this opinion is good law or not, he believes that the state board of health should confer with the general managers of the Missouri lines. He adds: "I feel confident that the railway authorities will be willing to enforce among their employees any reasonable regulations for the improvement of the sanitary conditions of the cars, and I am certain that the traveling public will be prompt to discriminate between those railways that do and those that do not observe such rules. Should it become necessary, the question of your authority ought to be determined by the institution of a prosecution, but I am satisfied that this will be unnecessary if the matter is taken up in the right way with the railway and sleeping car officials."

New Wood Preserving Plant for the Pennsylvania.

The Pennsylvania has just awarded a contract for the erection of a complete pressure wood-preserving plant at Point House pier, Greenwich point, Philadelphia, Pa. In addition to the plant to be built, the company now has one at Mt. Union,

Pa., and a small experimental plant at Greenwich point, both of which are in successful operation. It is estimated that proper treatment will increase the life of ties from two to three fold. Applied to all of the 100,000,000 ties which American railways use annually it would greatly reduce the drain on the rapidly decreasing timber resources. The Pennsylvania Railroad alone uses from 3,500,000 to 4,000,000 ties each year for renewals and new work. The average life of these red oak and chestnut ties under present conditions in main running tracks is from three to four years, while white oak lasts from seven to eight years. It is estimated that preservative treatment will increase the life of red oak and other treatable ties to at least 15 years. The Pennsylvania's enormous requirements for ties and lumber strip the timber from some 50,000 acres annually. It is estimated that by proper treating with preservatives even a part of this timber, its life will be so increased that perhaps 25,000 acres will supply the company's requirements. A contract was placed last November for a tie treating plant at Mt. Union, and for two large creosote storage tanks to be located at Greenwich point. The new plant to be built at Philadelphia will be similar to the one now in operation at Mt. Union, except that it will be designed to accommodate an additional cylinder whenever it is needed. The building will be 50 ft. x 150 ft., and of steel frame and corrugated iron construction. There will also be a storage yard covering an area of about 25 acres along the Delaware river, with capacity for from 750,000 to 1,000,000 ties. Storage tracks will be built and a 24-in. gage track will be laid for the operation of the cylinder cars. In addition to ties many other classes of material will be given preservative treatment, including bridge timbers, telegraph poles, cross-arms, planking and shingles. The capacity of one cylinder will be from 750,000 to 1,000,000 ties per year, working day and night shifts. The two treating plants of the company will have a capacity of 1,500,000 ties per year.

Opening of Dakota Lands.

In accordance with a proclamation issued by President Taft, a tract of about 2,500,000 acres of land, situated in the Cheyenne River and Standing Rock reservations in North and South Dakota, will be opened for settlement on October 26. The prices to be charged for the homesteads range from 50 cents to \$6 an acre, according to quality and location. The proclamation provides that the order in which applicants shall be permitted to select and enter these lands shall be determined by registration and drawing. Registration will be begun at Aberdeen, S. Dak., on October 4, and will be continued through October 23.

Wisconsin Back Taxes.

The suits for alleged back taxes brought against Wisconsin roads will be either compromised or settled in court, according to the decision of the special legislative committee now conferring with Frank L. Gilbert, attorney-general. The suits were begun under the administration of Gov. La Follette to recover from the railways sums which it was claimed they had failed to pay under the old gross earnings law. The railways contend that they have not only paid the state all that was due it, but that they have even overpaid, having been taxed on gross earnings arising outside of the state, which is an assessment on interstate commerce. The unsettled suits have been to the supreme court on several appeals. The total state claims are \$400,000.

New Office Building of the Rock Island.

The Chicago, Rock Island & Pacific has just completed a three-story brick office building at the northeast corner of Seventy-first street and Stewart avenue, in Chicago, and is transferring to it from the La Salle street station the offices of the car accountant, the auditor of freight traffic, the auditor of passenger traffic and the auditor of disbursements. There are 600 employees in the offices referred to.

The purpose in erecting the new building was to relieve the congestion in the La Salle street station. When it was built there was plenty of room for the offices of the Lake Shore,

the Chicago & Eastern Illinois, the Rock Island and their subsidiaries, but the demands of the Rock Island have increased until it has been using part of the Lake Shore's space in the station and also space in outside buildings. The Lake Shore will now take back all of its own space, and C. E. Schaff, vice-president; B. B. Mitchell, general freight traffic manager; G. H. Ingalls, freight traffic manager; and Warren J. Lynch, passenger traffic manager, will move their offices to the twelfth floor.

The Rock Island's new office building, which is far removed from the dirt and noise of the downtown business district, has 25,000 sq. ft. of floor space on each floor, and cost approximately \$150,000. This road's action in moving part of its offices from the downtown district illustrates a tendency of roads entering Chicago. The St. Paul already has an office building on Fullerton avenue, and the Alton is preparing to build a large office building in an outlying district to which a large part of its present office force will be transferred from the Railway Exchange.

A Non-Magnetic Ship.

The non-magnetic surveying yacht Carnegie has just been built at Tebo's yacht basin, South Brooklyn, N. Y. The Carnegie is the property of the Carnegie Institution. She is unique in construction. No other vessel like her has ever been built. There is not a particle of iron or steel in the entire vessel, except the pistons in a small engine and some small cam rollers of steel. All the rest of the metal work is of bronze. The keel, double frames, waterways and dead wood are of oak; keelsons, carlines, planking and ceiling of white pine; the companionways, hatch, coamings, deck-house corners, rails and stanchions are of malmame teakwood, the body of the deck-house being of white pine. The vessel is reported to have cost \$125,000.

Codifying Eminent Domain Out.

Owing to the work of the Alabama Law Code Committee which has just revised the laws of that state, the Atlanta, Birmingham & Atlantic has been compelled to suspend construction work between Bessemer and Birmingham, a distance of about 10 miles. The law as codified reads as follows:

"3487.—Lines, works, etc., not to be constructed through yards, curtilage dwellings, gardens, stable lots, etc. No street railroad company or any other corporation shall, without the consent of the owner construct any railway, tramway, canal, tunnel, underground passage, telegraph or telephone lines, aqueduct, pipe line or any other line or works through any yard or curtilage or dwelling house, garden, stable lot or barn."

The law before it was codified specifically excepted steam railways from this clause, conferring upon them the ordinary rights of eminent domain. The code committee, however, was selected largely because of the well-known hostility of its members to corporations and railways, and the committee therefore proceeded to make it substantially impossible for any railway to build within the state until the clause should be realtered. In one case the Atlanta, Birmingham & Atlantic endeavored to obtain right-of-way through a very small lot, on which was a house worth perhaps \$500, the whole property being valued from \$1,000 to \$1,500. The company offered \$4,000 and was told by the attorneys representing the owner they would not take less than \$25,000. And the codified law gives the company no recourse, except to pay whatever price is asked for a speculative hold-up, or to stop building!

As Others See Us; or the P. T. M. and His Rhetorician.

The man or woman bent on a vacation, having long put off decision where to go, suddenly finds the clouds parted, and there stands revealed the Genie of the Railroad bowing, beckoning and stretching forth a handful of "literature." The kingdoms of the earth are open before you, and lo! every spot is an Eden. You are amazed at the perfection of the landscape wherever the railway runs. It seems to have more stimulative power upon Nature than does irrigation. * * * Unfortunately, the method overreaches itself. The passionate

scribe raises all Nature to the *nth* power. And as his ardor increases, his gift of coherent expression wanes. Adjectives run riot. This vista is "idyllic," that landscape "pastoral," the other outlook "enthraling" or "bewitching."

In common with the freshman and the circus showman, the more the railway poet tries to load his phrases with heavy import the less specific he makes them. He is not content to tell what is to be seen or heard; he wants to pour out all the mysteries of the natural world. As a result appear generalizations like the following:

— is ideally situated; the waters of the historic lake dotted with innumerable islands spread out before her, and beyond, the blue peaks of the Adirondacks present a scene well worth witnessing.

But the climax of sublimity is reached at the loftiest peak in one state, when the railway littérateur remarks:

The view from the top of this mountain is excellent.

Elaborate paraphrases prevail. Feast upon this:

Its unique beauty consists of the elements of nature, which make an almost ideal scenery for a rural city;

... Its boundary of mountains on both sides, with their bowed peaks, purple, mystic, or snow-covered, according to the ever-varying meteoric conditions, and with the help of perspective and atmospheric illusion, constituting a circular framework to the most entrancing of pictures.

This is Ouida gone to seed. * * * Evidently, Nature is running amuck for your particular benefit. The "prospectus literature" settles your problems. You have only to buy your ticket to a region whose sentence structure is full of vistas, where the groves of adjectives are cool and the adverbs capped with snow.—*Evening Post*, New York.

Adjusting Employees' Pay.

In an interesting address at Lehigh University by Francis C. Green, President of the Commercial Engineering Co., is the following suggestion:

"A man is not paid for knowledge, but for accomplishments, and he who works for money alone is a fool who sells himself cheap. The force necessary to make the step from knowing to doing is like that of the latent heat necessary in turning water into steam. Everyone has a feeling regarding the proper pecuniary value of his services. The capable executive officer is he who accurately judges that feeling and then pays a little more, as the most efficient and loyal work is given where there is a desire and anxiety to fully earn the salary. An employee who feels underpaid holds back much more than the difference, and no feeling is so contagious. If it is not possible to pay a man just a little more than he himself really feels he is worth, it is time to discharge him, always having in view, however, the fact that the company must make money out of the services of its employees, otherwise it would have no reason for hiring them, as no business is a charitable organization. The mere fact that two men are apparently doing the same work does not entitle them to equal pay. One man may have more potentiality than the other, *i. e.*, more experience, reserve force or general touch with the business, making him the more valuable man in case of emergency and more easily promoted. The difference in salary might be considered as the interest on the capital represented by experience."

International Railway Master Blacksmiths' Association.

The seventeenth annual convention was held at the Cataract House, Niagara Falls, N. Y., Aug. 17-19. There was the largest number of members present in the history of the association. The Rev. Mr. Walsh, of Niagara University, offered the opening prayer. In the absence of the mayor, the Rev. Frederick S. Parkhurst welcomed the association to the city. His address was responded to by W. W. McLellan in behalf of the convention.

Detroit, Mich., was selected as the next meeting place, and the following officers elected: President, G. W. Kelly, Elizabeth, N. J.; first vice-president, John Conners, Montgomery, Ala.; second vice-president, F. F. Hoeffle, Louisville, Ky.; secretary and treasurer, A. L. Woodworth, Lima, Ohio; chemist, G. H. Williams, Boston, Mass.

American Railway Bridge and Building Association.

The nineteenth annual convention will be held at the Windsor Hotel at Jacksonville, Fla., October 19-21. Special hotel rates at the Windsor have been made. The first day's sessions will consist of the usual business, annual reports and committee reports, and in the evening there will be a steamboat trip on the St. Johns river. The second day there will be a morning session, and the afternoon will be spent in a trip to the Florida ostrich farm. There will be a session in the evening. The final session will be on the morning of the third day. In the afternoon a special train will leave over the Florida East Coast for St. Augustine. A trip later in the week has been arranged over the extension to Knights Key. The Pullman Company has made the usual arrangement of a one-way fare for the round trips for those going to and returning from the convention.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa. June, 1910; Niagara Falls, Ont.
 AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio.
 AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York. Nov. 17; Chicago.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago. March 14-17, 1910; Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—R. E. Wilson, Ry. Exchange, Chicago.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York; Oct. 18-22; Denver, Colo.
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. June 29, 1910; Colorado Springs.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago. May 16-20, 1910; Los Angeles.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York. Dec. 14-15; Chattanooga.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va. June 15, 1910; California.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—E. C. Cook, Royal Insurance Bldg., Chicago.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month; except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month; except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa. Oct. 12-14; Louisville, Ky.
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Sept. 14-17; Washington.
 ST. LOUIS RAILWAY CLUB.—E. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago; Sept. 7-8; Hotel Champlain, N. Y.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
 SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R., East Buffalo, N. Y.; September, 1909; Denver.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St.; Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The executive committee of the Western Passenger Association has recommended the abolition of first class party rates at 2 cents a mile.

Owing to the heavy traffic developed by the gasoline motor cars running on the Southern Pacific between Sacramento and Stockton and between Stockton and Fresno, these cars are to be replaced by steam trains.

The Buffalo & Susquehanna reports for the seven months ending July 31, a movement of over one million tons of coal and coke originating on its line, as compared with 680,000 tons the first seven months of 1908.

The steamship *George Washington*, of the North German Lloyd Line, is due to arrive in New York August 29 with 1,351 cabin passengers on board, which is the high record for the cabin, although the steerage record is approximately 3,000.

Beginning June 25, the running time of the night express train from Dallas to St. Louis, running over the Texas & Pacific and the Iron Mountain, was shortened from 23 hours and 35 minutes to an even 23 hours. The southbound running time between St. Louis and Dallas is shortened by two hours, and the run is now made in 23 hours and 10 minutes.

The Import Rate Committee of the Trunk Line Association met in New York August 19, to consider the existing rate war on import shipments bound to the West. The rates are now at the low record in many cases, and notice of additional reductions has been filed with the commission. The rate committee could make no headway, however, and adjourned, subject to the call of the chairman.

Two conferences have been held in Chicago recently by presidents of the western roads at which the matter of fixing 2 cents a mile as the minimum passenger fare in all states having 2-cent fare laws has been considered. An attempt was made to prevent the reduction of passenger fares below this amount in states having 2-cent fare laws during the present year, but it failed. It is now proposed to establish 2 cents a mile as the minimum beginning with January 1, 1910.

It is reported that all the steamship lines on the Atlantic coast are doing an unusually good business. The traffic of the Mallory Line is said to be running 25 per cent. greater than it was in 1907, heretofore the high year. The Savannah Line is building two large new steamers for New York trade. It is understood that the American-Hawaiian Line is contemplating adding New Orleans to its list of ports on the Atlantic and Pacific coasts, which unites with its through service in connection with the Tehuantepec Railway.

The Chicago & North Western has added a new daily train to its service from Chicago to the Pacific coast. It is to be known as the "Oregon-Washington Limited" and will make the trip on the 3-day schedule now in use by the Chicago-Portland special. The equipment will include Pullman drawing room sleeping cars, Pullman tourist sleeping cars, Pullman private compartment and observation sleeping cars and free reclining chair cars, all of which will be handled between Chicago and Portland without change. The train made its first trip August 22, leaving Chicago at 11.30 a.m.

According to the figures presented by the New York upstate commission, 55,551 passenger trains were reported for the month of June, of which 92 per cent. were on time at their division terminal. The average delay for each late train was 22.2 minutes; the average delay for each train run was 1.7 minutes. Waiting for trains on other divisions caused 23 per cent. of the delays, and train work at stations caused 21.8 per cent. Next in order as a cause of delay was waiting for train connections with other railways, 13.4 per cent. No other single source aggregated as much as 9 per cent. of the total.

Charles Aldington, assistant superintendent of the Great Western Railway of England, arrived in this country last week, and he is reported as saying that the schedule of the *Mauretania*, by way of the new Fishguard route, will be as

follows: Leave New York noon, August 25; arrive London, via Fishguard, 8 p.m., August 30. Paris special leaves London 9 p.m., August 30; arrives Paris 5 a.m., August 31. This is materially faster time than has ever yet been made from New York to London or from New York to Paris. The distance from New York to Fishguard direct is 2,902 miles, as against 3,015 miles from New York to Liverpool, and 2,957 miles from New York to Plymouth. By crossing last week in four days 14 hours and 38 minutes the *Mauretania* again beat all ocean records.

The New York Public Service Commission, Second district, has received from Hannibal Green's Son & Co., of Troy, a complaint asking for an amendment of the order made in the case of various Troy shippers as to the loading and unloading of carload package freight. The applicant says that tallymen have heretofore been employed by carriers in checking various kinds of carload freight in and out of cars other than package freight. The applicant further claims that the principle of the decision announced by the commission applies to all carload freight which is tallied in and out of cars but that the New York Central & Hudson River, Delaware & Hudson and Boston & Maine do not assist in handling the applicant's traffic, which consists of iron and steel articles which are either not to be denominated as package freight or are in bundles or in packages not in strict application of the term.

In July, 1907, the Chicago, Milwaukee & St. Paul issued a tariff under which it absorbs the charge for transferring bulk grain received at Milwaukee from its cars to the lake boats at that point. At the instance of W. M. Hopkins, transportation manager of the Chicago Board of Trade, the Chicago, Rock Island & Pacific, to meet this competition at St. Paul has issued a tariff, effective September 13, under which it will pay an allowance of $\frac{1}{2}$ a cent per bushel on grain transferred from its cars to lake boats at Chicago. The smaller grain dealers at Chicago are protesting against this action of the Rock Island on the ground that it operates to place them at a disadvantage in competing for business against the large grain dealers who have elevators at Chicago. The eastern roads are also protesting against it on the ground that it will tend to increase the amount of grain hauled eastward from Chicago by boat.

The San Pedro, Los Angeles & Salt Lake and other steam railways on the coast have refused to join with the Pacific Electric Railway in making through routes and joint rates to points outside the state, and a complaint of discrimination has been filed with the Interstate Commerce Commission in this town. The Pacific Electric Railway, of which H. E. Huntington is president, operates a network of electric lines in the vicinity of Los Angeles, extending to Balboa, Santa Ana, Delhi, Orange, San Pedro, Bliss, Pasadena, etc. It has 263 miles of standard gage and 50 miles of narrow gage track, and nearly half the system is double track. Besides the passenger business over the interurban lines and the city lines in Los Angeles, Pasadena, Long Beach, San Pedro, Santa Ana, Riverside and Monrovia, the company runs 20 freight trains a day, and has standard gage track connections with the Southern Pacific; Atchison, Topeka & Santa Fe, and San Pedro, Los Angeles & Salt Lake roads. The steam lines are withholding from agreement on the ground that they do not wish to make joint arrangements with electric lines.

The Kansas Railway Commission has prepared a report comparing railway freight rates from the East to points in interior Kansas with rates to points on the Missouri river. The report was prepared in obedience to a resolution of the legislature and gives detailed figures to show that when goods are shipped direct from a point east of the Missouri river to a jobbing point in Kansas and then reshipped the combination rate is higher than when the goods are shipped from an eastern point to Kansas City, Mo., and other points on the Missouri river, and then reshipped. For example, on goods shipped from St. Louis to Kansas City, Mo., and thence to Garden City, Kan., the combination first-class rate per 100 lbs. is \$1.54, but when they are shipped from St. Louis to Hutchinson, Kan., and jobbed from Hutchinson to Garden City the combination rate is \$1.71 $\frac{1}{2}$. As all students of traffic matters know, this difference is due to the use of the Missouri

river as a basing line. The board contends that the jobbers at interior Kansas points, such as Hutchinson, Wichita and Salina, are entitled to rates which will put them on a parity with the shippers at Kansas City in competing for the business of the retail merchants of Kansas, and states that it will co-operate in bringing a suit before the Interstate Commerce Commission to secure the abolition of the Missouri river as a basing line.

Interstate Commission's Decisions in Western Jobbers' Cases Held Illegal.

The United States circuit court for the seventh circuit rendered a decision at Chicago on August 24 holding the orders of the Interstate Commerce Commission in the Missouri river jobbers' case and the Denver jobbers' case illegal, and enjoining it from enforcing them. The decision was written by Judge P. S. Grosscup, and was concurred in by Judge C. C. Kohlsaat. Judge Francis E. Baker wrote a dissenting opinion.

In the Missouri river jobbers' case, the commission held that through class rates from the Atlantic seaboard to the Missouri river should be lower than the combination of local rates. (See *Railroad Age Gazette*, Sept. 18, 1908, p. 938.) In the Denver case it held that the through rates from Chicago to Denver should be lower than the combination rates. (See *Railroad Age Gazette*, April 9, 1909, p. 783.) The commission expressly stated in these decisions that they were based upon the principle, which it believed to be right, that the through rate should always be less than the combination of local rates over the same line.

The circuit court in its opinion, in raising the question as to whether the commission has the power to fix rates according to any such abstract principle, said this power as it existed was the "power artificially to apportion out the country into zones tributary to given trade centers to be predetermined by the commission." That this would be a power essentially different in principle from the mere power of naming rates that are reasonable is, the court thought, too clear on its face to render discussion necessary.

In these cases there was no testimony to show that the cost of carriage was less on the through than on the local traffic. In fact, it was stated in argument, and not contradicted, that the cost of service was not greater on reshipment than on through shipment. Furthermore, there were no competitive water lines to compel lower rates on through than on local business, such as those to the Twin Cities, to the Gulf or to the Pacific coast. The trade centers which were affected had grown up as the result of natural conditions. The Mississippi and the Missouri rivers were historic base lines. It was the purpose of the commission to annul these base lines on the principle heretofore stated. The court said that this principle may not be abstractly wrong. The question, however, was as to whether the commission had the power to establish rates on any such principle. Such a power, vaster than any body of men has heretofore exercised, even though wisely exerted in specific instances, would be putting in the hands of the commission the general power of life and death over every trade and manufacturing center in the United States. That the commission believed that it possessed this power and meant to exercise it, the court was convinced, both by its reasoning in the decisions and by its orders. Congress had adopted the protective tariff policy to protect American producers against the competition of foreign nations. Did Congress intend to extend that principle when it passed the Hepburn act so as to protect given zones in this country against the competition of other zones of territory?

If so, the court said, it would seem that Congress should have given the commission full power to fix rates. But the sole power given was to correct rates that were unreasonable or unduly discriminatory. The purpose was to prevent localities from being built up or destroyed by artificial rates—to take from the railways the power of life and death over industry and commerce and not to give that power to the commission. The court believed that if the commission's decision in the Missouri river jobbers' case was upheld, the effect would be to give shippers on the Atlantic seaboard and at the Missouri river an advantage over the shippers in central ter-

ritory, and that the decision in the Denver case would give shippers in central territory an advantage over shippers at the Missouri river. It had been contended for the commission that it had the right to fix rates that did not unduly discriminate between different localities. But the court said that the question was not whether the commission had power to fix rates that did not unduly discriminate, but whether it was not usurping power in attempting to fix rates on any such principle as was put forward in these cases at all, and it was held that it was. The court said in conclusion that in enjoining these orders it did not deal with the question of reductions in rates at all, but merely restrained the commission from imposing burdens and restrictions on commerce and manufacturers that congress never intended it should put there.

Judge Baker, in his dissenting opinion, said that he could not find that the Interstate Commerce law fixed any specific ground on which the commission could change rates, but gave it the general power to change rates which it found on any ground were unreasonable.

Terminal Charges in Chicago.

It has been practically agreed by the railways entering Chicago to establish a charge of 2 cents per 100 lbs. to be imposed on L. C. L. shipments handled between industries within the Chicago district and the freight stations of the railways either by steam railways, tunnel or lighters on the river. This rate will be based on a minimum business of 10,000 lbs. per day. In other words, the rate on L. C. L. shipments brought to the receiving stations of the steam railways will be the Chicago rate plus an arbitrary or privilege charge of 2 cents per 100 lbs. The same charge will be imposed when goods are delivered to points on belt railways, on the Chicago tunnel or by lighterage companies. The railways will continue to receive L. C. L. freight at outside stations such as those of the Chicago Terminal Transfer, the Chicago, West Pullman & Southern and the Illinois Northern, as they have in the past, without any addition to Chicago rates. They will also continue to receive freight delivered at public receiving stations of the lighterage companies and the tunnel company, absorbing whatever is necessary to get the traffic to their own stations. Public receiving stations not on trunk lines are defined as "only those open to the public or which have no facilities whatever for handling traffic except by street vehicles received from or delivered to such stations through public street entrances not connected in any way with any industry."

The position of the railways is officially explained as follows:

The present L. C. L. rates from Chicago were established when it was customary for all shippers of L. C. L. freight to deliver their merchandise to the railways at their regular receiving stations. In recent years the custom has grown up of large shippers putting their merchandise into cars at their warehouses and having them switched from there to the freight houses. This involved an additional service by the railways—that of switching the empty cars to the industry and the return of the load and also the unloading of the merchandise from the car into the warehouse. However, force of competition resulted in no charge being made for this extra service. Later the lighterage companies demanded that the railways should absorb their charges in the same way that the charges were absorbed when freight was shipped by car from industries to their depots. Some of the roads have been doing this, taking the position that they could just as well afford to absorb the charge of the lighterage company as of a railway company for switching the car. Recently the Illinois Tunnel Company has been demanding absorption of its charges. It has already secured this to the extent of the absorption by the railways of its charge from its public loading stations; also on traffic from industries that are already served by railways or lighters. This latter was granted by some of the roads on the same theory as the lighterage charge was absorbed. The Tunnel company was willing to take the L. C. L. freight for 4 cents, whereas the belt lines and other steam roads demanded 5 cents for the switching service, so it was more economical for some of the

railways to use the tunnel than either the lighters or other connecting railways to such industries as they did not reach themselves.

The only instrumentality for transferring L. C. L. freight from warehouses to depots whose charges are not now absorbed by the railways is the dray. The railways believe that it is necessary to take some steps at once that will avoid the extension of this policy to dray lines and to all of the tunnel company's lines. Inasmuch as the handling of freight direct to and from industries saves to the shipper what was formerly spent for drayage and adds to the expenses of the carriers over and above what was accepted when the Chicago rates were made, it is contended by the roads that it should not be considered burdensome for the roads to make some additional charge for the additional service. It costs the railway the same to handle freight from its depot to destination whether it reaches the depot by tunnel, railway, lighter or dray, and the roads feel that to the extent that they absorb the charge for delivering the freight at their stations by one means and not by some other means, there is an element of discrimination. The charge of 2 cents per 100 lbs. should not be considered an addition to the freight rates, but, since it is less than was formerly paid for drayage, a reduction on the cost of transportation.

Good Advice Regarding Marking of Freight.

The committee on freight claims of the National Industrial Traffic League, a shippers' organization, is distributing among its members a circular containing the following excellent advice about the marking of freight:

"We desire to call special attention to the vital importance of having all packages of freight for less than carload shipments legibly marked, and so marked as not to be obliterated by the ordinary risks of transportation.

"When necessary to use tags for marking they should be strong and durable, made of rope manila paper or linen, preferably the latter, and should be either sewed securely to the package or tied to it by a wire tie.

"Also dray tickets and bills of lading should be made out in a clear and legible manner. Examination of the files at railway stations shows that excessive carelessness exists in this regard in very many firms, the shipping tickets being made out in the most slipshod fashion, so that in very many cases billing clerks must guess at name of consignee, destination and articles.

"We are making complaint to the railways regarding the incomplete and sometimes illegible character of expense bills. * * * We certainly cannot expect this reform to be accomplished unless we do our own part." * * *

STATE COMMISSIONS.

The Wisconsin Railroad Commission on a complaint alleging inadequate train service recommended to the respondent company to give a fair trial to the operation of a motor car.

Iowa Commission Holds It May Advance Rates.

The Railroad Commission of Iowa has rendered an opinion that it has legal power to advance rates as well as to reduce them. The commission said, however, that this "is important rather as an abstract proposition than otherwise, for the reason that modern conditions all tend to a lowering of rates rather than raising them." The commission's opinion was given in passing on the application of several lines for an advance in rates on a number of articles. The Iowa law provides that the commission shall from time to time change rates in effect, "but the rates fixed shall not be higher than established by law." As the legislature never passed a law specifically fixing rates, the commission holds that it is left free to advance or reduce them as it may think just. The commission in its opinion said in part:

"A rate that is unreasonably low is just as illegal under the statute as though it was unreasonably high, and it goes

without saying that an unjust rate is always an illegal rate. If it were a settled principle that the commission had authority to revise schedules and classifications only downward, it would of necessity affect the mental attitude of the members of the commission. It would naturally cause a hesitation in the change of freight rates when there ought to be the utmost freedom in this respect when warranted by proper conditions, for the reason that it is a well known fact that conditions do frequently change and a rate that would be proper under certain conditions would be confiscatory under other conditions, and in the latter case the commission would be without power in the premises."

Wisconsin: Failure to Post Rates.

Kiel Wooden Ware Co. v. Chicago, Milwaukee & St. Paul.

The petition asks for refund on certain shipments of logs to Kiel, Wis., on the grounds that the schedule of rates on which the charges were based had not been filed at the station at Kiel and were therefore not in effect. Schedules must be filed with the railway commission and at the stations to and from which the rates in such schedules apply before becoming effective, and therefore the schedule in question, not having been filed at the station at Kiel, the rate collected was unlawful and refund ordered.

COURT NEWS.

The Chicago, Rock Island & Pacific and other western roads filed suit on August 18 in the United States Circuit Court at Chicago to enjoin the Interstate Commerce Commission from enforcing its order for the reduction of through class rates from Chicago to Des Moines, Iowa.

The federal court at Denver, Colo., has refused, for lack of jurisdiction, to grant the application of George J. Kindel for an injunction to restrain the Chicago, Rock Island & Pacific, the Colorado & Southern and the Atchison, Topeka & Santa Fe from advancing certain rates between Galveston and Denver. (*Railroad Age Gazette*, August 6, 1909, page 256.)

The Cleveland, Cincinnati, Chicago & St. Louis has filed a suit in the United States district court at Cincinnati for relief from an existing contract which is alleged to compel it to break the anti-rebate law. According to the terms of the contract, the road allowed a shipper to occupy six acres of ground at a nominal rental, and made other concessions to him.

Judge Murphy, of the Wayne county, Michigan, circuit court has rendered an opinion holding that the act creating the Michigan Railroad Commission is constitutional and that under it the commission has power to fix excess baggage rates. The decision was rendered in a suit brought by the Michigan lines to restrain the commission from enforcing its order fixing reducing baggage rates.

The United States Circuit Court at Charleston, W. Va., has granted an injunction restraining the state and county officials from enforcing the 2-cent fare law against the Norfolk & Western. The order requires the Norfolk & Western to issue coupons with 3-cent fare tickets providing for a rebate of one cent per mile should the case now pending in the State Supreme Court be decided against the railway.

The constitutionality of the full crew law recently enacted by the legislature of Indiana requiring passenger trains to have crews of five men and freight trains crews of six men has been appealed to the Supreme Court of the United States for interpretation in the case of *Indiana v. the Cleveland, Cincinnati, Chicago & St. Louis*. The company resisted its enforcement before the Indiana Railroad Commission and unsuccessfully contended that the law was unconstitutional before the Supreme Court of Indiana. From the adverse decision of the Indiana Supreme Court the company appeals, contending that the law interferes with interstate commerce and is therefore in contravention of the federal constitution.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

T. A. Cheal has been appointed the auditor of the Sierra Railway, with office at Jamestown, Cal., succeeding C. N. Hamblin, resigned.

A. L. Conrad has been elected the secretary and auditor of the Kansas South-Western, with office at Topeka, Kan., succeeding H. R. M. Smith.

J. L. Cramer, controller of the Cincinnati, Hamilton & Dayton, at Cincinnati, Ohio, has been elected the vice-president, succeeding G. F. Brownell.

F. H. Alfred has been appointed the assistant to the president of the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, and will perform such duties as may be assigned to him.

W. E. Green, formerly first vice-president and general superintendent of the Trinity & Brazos Valley and president of the Houston Belt & Terminal Railway, has been elected the vice-president and general manager of the Denver, Laramie & North Western, with office at Denver, Colo., succeeding A. E. Welby, deceased. Mr. Green was born at Fulton, Ill., September 26, 1853, and was educated in the public schools at Fulton. He began railway work in 1868 on the Chicago & North Western at Fulton, Ill., and until 1871 was successively freight handler, switchman and brakeman. From 1871 to 1874 he was a conductor on the Chicago & Alton, and from 1874 to 1878 was a conductor on the Rockford, Rock Island & St. Louis, now a part of the Chicago, Burlington & Quincy. From 1878 to 1881 he was conductor and yardmaster of the Southern Minnesota, now a part of the Chicago, Milwaukee & St. Paul. In 1884 he became general yardmaster of the Canadian Pacific, and in 1886 was made general yardmaster of the Chicago, Burlington & Quincy and the Burlington, Cedar Rapids & Northern, now a part of the Chicago, Rock Island & Pacific. From 1886 to 1888 he was trainmaster of the Chicago, Burlington & Quincy, and in the latter year became trainmaster and superintendent on the Union Pacific. From 1890 to 1892 he was general yardmaster of the Illinois Central, in charge of terminals at Chicago, and from 1892 to 1894 was superintendent of terminals of the World's Columbian Exposition at Chicago. In 1894 he became trainmaster of terminals of the Chicago & Alton at Chicago, and two years later was appointed general superintendent of the Chicago, Hammond & Western, now the Chicago Junction Railway. From January, 1898, to July, 1901, he was with the Kansas City, Pittsburg & Gulf and its successor, the Kansas City Southern, successively as superintendent, assistant superintendent and general superintendent. In 1901 he was appointed general superintendent of the Shreveport & Red River Valley, now the Louisiana Railway & Navigation Company, and in 1902 was elected the first vice-president and general superintendent of the St. Louis Southwestern. In March, 1907, he was elected the vice-president and general manager of the Trinity & Brazos Valley, later becoming also the president of the Houston Belt & Terminal Railway, which position he resigned in October, 1908.



W. E. Green.

Operating Officers.

J. P. Nash has been appointed a terminal trainmaster of the El Paso & Southwestern, at El Paso, Tex., succeeding C. E. Hollingsworth.

M. B. Cotter, general manager of the Minneapolis & St. Louis and the Iowa Central, at Minneapolis, Minn., has resigned, effective September 15.

Michael M. Leyendecker, chief train dispatcher of the Texas-Mexican, has been appointed the general superintendent, with office at Laredo, Tex., succeeding S. W. De Wolff, resigned.

H. S. Kerr, general solicitor of the Cerro de Pasco Railroad in Peru, has been appointed the general manager of the Jalapa Railway & Power Company, with office at Mexico City, Mex.

L. B. McDonald, chief clerk to the superintendent of the Galveston, Harrisburg & San Antonio at Victoria, Tex., has been appointed an assistant superintendent of transportation, with office at Victoria.

J. F. Corbett, chief dispatcher, Second and Fourth districts of the Oregon Railroad & Navigation Company and the Oregon, Washington & Idaho at Spokane, Wash., has been transferred to the Oregon division, with office at Portland, Ore. H. L. Buchanan, chief dispatcher, First and Third districts, at Starbuck, Wash., succeeds Mr. Corbett. Jay Beck succeeds Mr. Buchanan.

Traffic Officers.

C. B. Hart, general freight and passenger agent of the Midland Valley at Muskogee, Okla., has resigned.

Ely Ensign, traveling passenger agent of the Houston & Texas Central, has resigned, to go into other business.

B. Arnold, Jr., has been appointed a commercial agent of the Lake Erie & Western, with office at Cincinnati, Ohio.

Brent Arnold, Jr., has been appointed a commercial agent of the Lake Erie & Western, with office at Cincinnati, Ohio.

C. A. Pettibone has been appointed a traveling freight and passenger agent of the Wabash, with office at Portland, Ore.

J. R. Mockbee has been appointed a traveling freight agent of the St. Louis Southwestern of Texas, with office at Waco, Tex., succeeding J. W. King, resigned.

C. F. Osborn, general agent of the Erie Despatch, at Denver, Colo., has been appointed the assistant general manager, with office at Chicago, effective September 1.

L. W. Sanderson, soliciting freight agent of the Southern Railway at Dallas, Tex., has been appointed a traveling freight agent, with office at Dallas, succeeding W. T. Rembert, appointed commercial agent.

G. W. Harper, Jr., has been appointed a traveling freight and passenger agent of the Port Boliver Route of the Gulf & Interstate of Texas, with office at Galveston, Tex., succeeding W. J. Nolan, resigned.

G. C. Cormany, city passenger agent of the Erie at Dayton, Ohio, has been appointed a general passenger agent of the Erie Railroad and a general agent of the Erie Despatch, with office at Dayton, effective September 1.

V. M. Cluis, traveling freight agent of the Rock Island-Frisco System at Atlanta, Ga., has been appointed a commercial agent, with office at Atlanta, succeeding T. C. Tipton, resigned. L. E. Le Faivre succeeds Mr. Cluis.

W. C. Seachrest, North Pacific Coast agent of the New York Central Lines at Portland, Ore., has been appointed the general agent of the passenger department. His jurisdiction extends over the states of Oregon, Washington, Idaho and British Columbia.

J. W. King, traveling freight agent of the St. Louis Southwestern of Texas at Waco, Tex., has been appointed a traveling freight agent of the St. Louis, Iron Mountain & Southern, with office at San Antonio, Tex., succeeding D. C. Wood, granted leave of absence.

J. M. Sanford, formerly a contracting freight agent of the

Canadian Pacific and the Minneapolis, St. Paul & Sault Ste Marie, has been appointed a contracting freight agent of the Great Northern and the Great Northern Steamship Company, with office at St. Louis, Mo.

Engineering and Rolling Stock Officers.

H. C. Eich, master mechanic of the Illinois Central at Memphis, Tenn., has been transferred to the Burnside shops, Chicago, Ill.

Robert F. McKenna, master car builder of the Delaware, Lackawanna & Western, at Scranton, Pa., has resigned, effective September 1.

W. G. Arn, assistant engineer of the Illinois Central at New Orleans, La., has been appointed an assistant engineer at Louisville, Ky.

T. F. Quinn has been appointed a division master mechanic of the Oregon Railroad & Navigation Company and the Oregon, Washington & Idaho, with office at Starbuck, Wash., succeeding W. H. Dressel, resigned.

The office of master car builder of the Chicago, Indianapolis & Louisville, formerly held by C. Collier, resigned, having been abolished, the duties of this office will hereafter be performed by John Gill, superintendent of motive power.

The title of R. J. Lockwood, resident engineer in charge of construction of the Marshall & East Texas, at Marshall, Tex., has been changed to chief engineer. Mr. Lockwood has been appointed also chief engineer of the New Iberia & Northern, a line under construction in Louisiana.

Purchasing Officers.

J. L. Terry, assistant treasurer of the Denver, Laramie & Northwestern, has been appointed also the general purchasing agent, with office at Denver, Colo.

OBITUARY.

M. B. Bergeron, formerly secretary and treasurer of Morgan's Louisiana & Texas, died on August 19 in New Orleans, La.

R. W. Bryan, general superintendent of the Great Northern, with office at Minot, N. Dak., died at Pasadena, Cal., August 20, from injuries received in an accident.

F. H. Tibbitts, an assistant general freight agent of the Chicago Great Western at Chicago, Ill., died of apoplexy on August 21 at Evanston, Ill., aged 63 years.

Captain John Francis Divine, assistant general superintendent of the Atlantic Coast Line at Wilmington, N. C., died recently at that place at the age of 80 years.

Robert Reid, of Ottawa, Ont., a member of the Transcontinental Railway Commission of Canada, died suddenly on August 22 from cerebral hemorrhage, at Ogunquit, Me.

Henry Dean Fuller, of New York, secretary of the Genesee & Wyoming Railroad Co., died suddenly August 23 near Bridgeport, Conn., while on an automobile trip. Mr. Fuller was born January 6, 1846, and was unmarried.

Allen Vail, formerly master mechanic of the Buffalo division of the Pennsylvania, died on August 20 at his home in Buffalo, N. Y. Mr. Vail was born October 11, 1844, at Middletown, Rutland county, Vt., and began railway work in February, 1862. He was a machinist in the New York Central shops at Buffalo, leaving that position in February, 1868, to go to the Buffalo & Washington, now part of the Pennsylvania, as engineer, which position he held for two years. He became engineer and master mechanic and a little over two years later he was appointed master mechanic, which position he held until February, 1882, when he was appointed superintendent of motive power and machinery. From July, 1884, to August, 1900, he was successively master mechanic of the Buffalo, New York & Philadelphia and general master mechanic of the Western New York & Pennsylvania. Both these lines are now part of the Pennsylvania. In August, 1900, he was appointed master mechanic of the Pennsylvania at Buffalo.

Railroad Construction.

New Incorporations, Surveys, Etc.

ARKANSAS, LOUISIANA & GULF.—According to press reports arrangements have been made to build the extension from Hamburg, Ark., north via Pine Bluff, thence to a connection with the Chicago, Rock Island & Pacific at De Valls Bluffs, about 130 miles from Hamburg. (July 23, p. 167.)

ATCHISON, TOPEKA & SANTA FE.—According to press reports plans are under way for replacing the present track with 90-lb. rails on about 150 miles of the road between Arkansas City, Kan., and Purcell, Okla.

BRITISH COLUMBIA (ELECTRIC).—Contract is said to be let to the Puget Sound Ditch & Dredging Co. for work on section 3, from Abbotsford, B. C., to Miles, 12 miles. Contract for the section from Miles east to Chilliwack is to be let shortly.

BUFFALO, ROCHESTER & PITTSBURGH.—The Clearfield & Mahoning, under lease to the Buffalo, Rochester & Pittsburgh, has increased its capital stock from \$750,000 to \$1,000,000 to provide funds for revision of line and other improvements, on which work has been started. (Aug. 20, p. 339.)

CANADIAN NORTHERN.—Contract is said to be let to James Higgins, of Prince Albert, Sask., for building a 30-mile extension from Shell Brook, Sask., the work to be started at once.

CANADIAN PACIFIC.—Bids are wanted September 8 by R. Marpole, of Vancouver, B. C., for building an extension of the Esquimaux & Nanaimo from mile 108 to Alberni, 27½ miles.

CHICAGO, MILWAUKEE & PUGET SOUND.—Plans are said to be made for building a branch from Malden, on the present line in Whitman county, Wash., north to Spokane, about 35 miles.

CHICAGO & NORTH WESTERN.—The Bellefouche Valley has filed an application in South Dakota for an extension of its line from the present terminus in section 29, township 9, north, range 6, east, to a point in section 12, township 8, north, range 14, east about 60 miles. The route from Bellefouche is east through the government irrigation project in the valley of the same name, via Stoneville, to a point near White Owl in the eastern part of Meade county. Surveyors are now at work from near White Owl southeast to Philip, on the Pierre-Rapid City line. Such a line would run around the Black Hills and avoid the heavy grades necessary in that section. It is understood that work will be started soon from Bellefouche northwest toward Miles City, Mont.

CHICAGO, ROCK ISLAND & PACIFIC.—Contract is said to have been given to the Dalhoff Construction Co. for building a six-mile line to connect the Rock Island at Hulbert, Ark., with the St. Louis & San Francisco at Marion. (Feb. 5, p. 282.)

CLEARFIELD & MAHONING.—See Buffalo, Rochester & Pittsburgh.

COPPER RIVER & NORTHWESTERN.—See Copper River Railway. (Aug. 13, p. 296.)

COPPER RIVER RAILWAY.—An officer writes that about 2,700 men are now at work building this line. From Cordova, Alaska, east on the first 38 miles to the Copper river, the line is called the Copper River & Northwestern, and from that point north, thence east to the Bonanza mines, 200 miles from Cordova, with a 20-mile line east from the junction with the Copper River & Northwestern, via Katalla, to a point northeast of that place, it is called the Copper River Railway. The road is now in operation for 54 miles and it is expected to finish an additional 56 miles this year. The company has finished work during the past year on steel bridges as follows: At the lower crossing of the Copper river, 27 miles from Cordova, over the first channel, one 300-ft. span, one 150-ft. span and four 175-ft. spans; at the second channel crossing, one 300-ft. span and one 260-ft. span, and at the third channel crossing three 200-ft. spans; at the Miles Glacier crossing of Copper river work is now under way on the piers and abutments for a cantilever bridge, on which the following steel spans will be erected next year: Two of 400-ft., one of 300-ft. and one of 450-ft. A number of additional bridges are to be built above this point on the line.

The company's men are putting up the bridges and the steel for the superstructures is being supplied by the United States Steel Corporation. M. J. Heney, Seattle, Wash., has the general contract to build the line.

DENVER, NORTHWESTERN & PACIFIC.—It is understood that plans are being made to push the work on this line from its present western terminus at Steamboat Springs, Colo., to the San Pedro, Los Angeles & Salt Lake and the Denver & Rio Grande, at Provo City, Utah, 30 miles south of Salt Lake City, and contracts will be let shortly for the first 20 miles from Steamboat Springs west to Hayden. The company was organized to build an air line from Denver, Colo., west to Salt Lake City, 560 miles. Notes have been recently sold and arrangements have been made with New York interests to finance the work to completion. The line is now in operation from Denver west to Steamboat Springs, 214 miles. (Aug. 6, p. 258.)

DULUTH, SOUTH SHORE & ATLANTIC.—Plans are said to have been made to lay four miles of track from Eagle Mills, Mich., to Negaunee, alongside the track to be put in by the Lake Superior & Ishpeming for the Cleveland Iron Co. This will give the D., S. S. & A. a double-track between Negaunee and Marquette, 12 miles.

ESQUIMAULT & NANAIMO.—See Canadian Pacific.

FLORIDA ROADS.—Application has been made for a franchise at Pensacola, Fla., and as soon as this is granted work is to be started on a line from that place northeast to Andalusia, Ala., about 80 miles. W. K. Hyer, of the First National Bank of Pensacola, and associates of that place are back of the project.

GRAND TRUNK PACIFIC.—According to press reports a contract has been given to Foley, Welsh & Stewart, of Toronto, Ont., and Winnipeg, Man., for the second section east of Prince Rupert, of 140 miles, from the Copper river east to Aldermere. The contract is said to be worth about \$10,000,000. The work includes several long tunnels, one of which is about one-half mile long. At the Skeena river a cantilever bridge is to be put up, 16 miles below Hazelton. (Aug. 20, p. 339.)

GREAT NORTHERN.—An officer writes that bids are being asked for building the line from Oroville, Wash., down the valley of the Okanogan river to Brewster, about 60 miles. Contracts for additional work have been let as follows:

For the new branch from Bainville, Mont., north 50 miles, also for the branch from Stanley, N. Dak., north 24 miles. (Aug. 20, p. 339.)

The line now being built from the Columbia river, in Douglas county, Washington, on the Moses Coulee branch, 62 miles, is expected to be finished this fall. (March 19, p. 654.)

GULF, SOASH & PACIFIC.—An officer writes that it is intended to have this projected line in operation early in 1911 for about 50 miles from Big Springs, in Howard county, Tex., northwesterly via Soash. The incorporators include: W. P. Soash and W. Fisher, of Big Springs; T. H. Peters, chief engineer. (Aug. 20, p. 339.)

GULF, TEXAS & WESTERN.—An officer writes confirming the report that this road was opened for operation on August 25 from Jacksboro, Tex., west to Jeanette, seven miles, and from Olney east to Royalton, 10.4 miles. The line is projected from Burr's Ferry northwest to Benjamin, about 500 miles. Plans are being made to open the section from Jacksboro west to Olney, about 41 miles, not later than October 1. (Aug. 20, p. 339.)

HUNTINGTON & NORTHERN.—Rights-of-way are being secured. It is said, in Virginia and Ohio for this projected line. The plans include a bridge over the Ohio river. The line is to furnish an outlet to the lakes for coal from West Virginia. It is understood that J. P. Morgan & Co. and associates are back of the project.

KANSAS CITY, HARLEM & ST. JOSEPH.—Incorporated in Missouri, with \$350,000 capital, to build from Kansas City, Mo., north via Dearborn, in Platte county, to St. Joseph, with a branch from St. Joseph, in all 53 miles. E. J. Ward and R.

B. Troop, of Chicago; D. O. Ketcham, J. H. Cummings, Jr., and A. A. Dunham, of Kansas City, are directors.

LAKE SUPERIOR & ISHPEMING.—See Duluth, South Shore & Atlantic.

LEHIGH VALLEY.—This company plans to spend about \$1,000,000 four-tracking its lines between Easton, Pa., and Slatington. Contracts for the work have been let to F. H. Clement & Co. and to J. S. Kelley & Co., of Philadelphia. On the present line in that section there are about 25 miles of four-track lines, and it is the intention to ultimately track the line from Penn Haven for about 60 miles of the three-track line.

LONG ISLAND.—In an application to the New York Public Service Commission, First district, to issue bonds, plans were submitted for work to be carried out on the Long Island as follows: Main line improvements between Woodside and Jamaica, to cost \$2,000,000; Jamaica terminal, \$1,000,000; Northside improvements, double-tracking and electrification of line, \$1,000,000; Bay Ridge improvements, elimination of grade crossings, \$1,000,000; various freight delivery yards, passenger stations, sidings, double track, grade crossings, etc., \$912,662; electrical equipment of tracks and sub-stations, \$800,000; Glendale cut-off, \$309,382; Montauk freight cut-off, \$287,400; completion of Atlantic avenue improvements, \$100,000. See mention of this company under Railroad Financial News. (Aug. 6, p. 258.)

MARSHALL & EAST TEXAS.—An officer writes confirming the report that a grading contract has been given to Kaiser & Maloney for building six miles additional on the Sabine valley extension to carry the line in Panola county, and this work is now under way. Grading on the first 12 miles from Marshall, Tex., south, was finished recently and over eight miles of track are laid and surfaced. Track laying on the 12 miles will be finished soon. (Aug. 13, p. 297.)

MISSOURI ROADS (ELECTRIC).—Plans are being made to build a line from Clayton, Mo., northwest to Creve Coeur lake, about 15 miles. F. Essen, of St. Louis, associated with capitalists of that place, are back of the project.

MODESTO INTERURBAN.—An officer writes that grading work has been finished and track laying is to be started at once from Modesto, Cal., east to a connection with the Atchison, Topeka & Santa Fe, about five miles. The Pacific Construction Co. is putting up a steel bridge over Dry creek and it is expected to have the line in operation about October 1. Right-of-way has been secured for an extension from Modesto south via Crows Landing to Newman, 25 miles. T. K. Beard, president, Modesto.

NASHVILLE INTERURBAN.—Plans are said to be made and contracts are to be let next month for building a number of inter-urban electric lines, radiated from Nashville, Tenn. The Fidelity Investment Co., recently organized by J. A. Pitts, R. W. McLeomore, R. A. Dailey, Sr., and R. A. Dailey, Jr., is to carry out the work. H. H. Mayberry, president of the Nashville Interurban, is said to be back of the project.

NATIONAL RAILWAYS OF MEXICO.—According to press reports from Mexico City a contract has been entered into between the National Railways of Mexico, the city of Durango and the Campana Maderia de La Sierra de Durango, whereby the railway is to build a branch line west, about 63 miles, to form the first link of the projected line from Durango to the Pacific. The cost of this section on which work is to be started within 60 days will be about \$4,000,000. (April 16, p. 871.)

NEVADA-CALIFORNIA-OREGON.—An officer is quoted as saying that the company will spend \$5,000,000 for improvements and equipping this road, now in operation from Reno, Nev., northwest and north to Alturas, Cal., 184 miles. An extension is to be built from the northern terminus, north 58 miles, to Lake View, Ore., and eventually an additional 278 miles north to the Columbia river at The Dalles or some other convenient point.

OHIO VALLEY TRACTION.—An officer writes that the projected route is from Joppa, Ill., east via Metropolis, Brookport and Unionville, to New Liberty, 25 miles, thence north via Hamletburg and Bay City to Golconda, in all 45 miles. O. H. Margrave, Brookport, may be addressed. (Aug. 13, p. 297.)

OREGON SHORT LINE.—An officer writes that surveys are under way for an extension of the Minidoka & Southwestern, from Buhl, Idaho, west, and that a grading contract has been let to the Utah Construction Co., of Ogden, Utah, for the new line from Rupert, Idaho, on the Minidoka & Southwestern, west, running north of the Snake river to Bliss, on the main line, 73 miles. (Aug. 20, p. 340.)

OREGON TRUNK LINE.—Announcement has been made that this line, being built by Porter Brothers, from The Dalles, Ore., south through the Des Chutes river valley to Madras, in central Oregon, 122 miles, is controlled by John F. Stevens, former chief engineer of the Panama canal, and that James J. Hill is the financial backer of the project. According to press reports an injunction suit has been filed in Wasco county by the Harriman interests, building a line under the name of the Des Chutes Railroad south through the Des Chutes river valley to Redmond, 130 miles, to restrain the Oregon Trunk Line from building on a section of about seven miles in the Horseshoe Bend district, where the surveys of both these companies conflict. It is also said that the Oregon Trunk has begun injunction proceedings against the Harriman interests regarding a disputed right-of-way for a distance of about seven and one-half miles on the first 40 miles of the proposed line. (Aug. 20, p. 339.)

PENNSYLVANIA.—Bids are in for improvements to cost about \$1,000,000 to be made at Greensburg, Pa. The work includes laying two additional tracks through Greensburg, building a new station, the removal of a tunnel and reducing the present grade of 1 per cent. to $\frac{1}{2}$ per cent. The company has almost completed its four-track line from Pittsburgh to New York; at several places there remains short stretches of two and three-track road. These gaps are being rapidly removed by the construction of additional tracks. On the Pittsburgh division there is a one-mile stretch of two-track line through Greensburg, a half mile through Radebaugh, where there is a tunnel, and two miles of three-track line through Sang Hollow. With the completion of the Greensburg improvements only two and one-half miles of the two and three-track road will remain on the Pittsburgh division of the main line. The improvements are being made to overcome the difficulty in starting heavy westbound passenger trains from Greensburg station as well as to facilitate the movement of freight trains. The 275-ft. tunnel at present under Main street is to be removed and the existing grade crossing at Harrison avenue will be eliminated. The 16-ft. arch bridge at Arch street will be replaced by a 40-ft. arch, under which the street will run. This new bridge will be 150 ft. long and will contain 6,000 cu. yds. of masonry. The tracks at this point are 50 ft. above the ground and the work on this arch will be expensive. Reinforced concrete bridges will be built at Maple street, Main street and Pennsylvania avenue, and the cut between Main street and Pennsylvania avenue will be widened to accommodate four tracks. At Harrison avenue the company proposes to build a tunnel 100 ft. long under the tracks for the use of passengers and pedestrians, and an arch will be built joining Harrison and Brushton avenues. The proposed bridge will be 235 ft. long, as the tracks are on a very high embankment at this point, and will contain 10,000 cu. yds. of masonry. The new station will have island platforms for the use of passengers. In addition to the above improvements the company will lay out, grade and pave three new streets. This will involve the laying of 10,000 sq. yds. of street paving, 6,000 yds. of sidewalk paving and 3,000 lineal ft. of curbing. The total amount of embankment to be placed for the entire work will be about 180,000 cu. yds. and the excavations will total about 100,000 cu. yds. In connection with the work at Greensburg the railway is to construct an undergrade connection between the main line and the Southwest branch. This will eliminate the crossing at grade of the eastbound tracks by Southwest branch trains.

PENNSYLVANIA LINES WEST.—An officer writes that the contracts for double-tracking and grade revision work on the Pennsylvania Lines West have been let as follows: Second track work on the Logansport division to C. A. Sims & Co., of Philadelphia, Pa.; The France Co., Bloomville, Ohio; Jones Brothers, Columbus, Ohio; H. E. Culbertson & Co., Cleveland, Ohio; Essex Construction Co., Buffalo, N. Y.; the Sturm &

Dillard Co., Columbus, Ohio, and Oliver Brothers & Callaway, of Chicago. On the Indianapolis division contracts have been let for the grading and masonry for the second track roadbed to the Drake & Stratton Co., P. F. Brendlinger, both of Philadelphia, Pa., and the Lorimer & Gallagher Co., of Chicago. Work on the diversion of line on the Louisville division, to meet the new grade on the Indianapolis division, has also been let to the Lorimer & Gallagher Co. (Aug. 13, p. 297.)

PORT ARTHUR TRACTION CO.—Recently organized in Texas, with \$200,000 capital, to build an extensive system of street railways, also to build a number of interurban electric lines radiating out of Port Arthur. H. J. Myers, A. H. Reeder and S. M. Krohn, all of Dayton, Ohio, are interested.

PROVIDENT RAILWAY RIGHT-OF-WAY CO.—See Texas Roads.

QUINCY, MOUNT STERLING & NORTHEASTERN.—Incorporated in Illinois, with \$5,000 capital and office at Quincy, Ill., to build from Quincy east via Liberty, thence northeast via Mount Sterling to Rushville, about 50 miles. The incorporators and directors include: B. Ryan, E. G. Koch, E. Miller, G. V. Zumsted and L. H. Menne.

ST. LOUIS & SAN FRANCISCO.—According to press reports contracts have been given to construct large yards at Marion, Ark., across the Mississippi river from Memphis, Tenn. The improvements are to cost \$200,000 and are being carried out to relieve the congestion at the Memphis yards.

SOUTHERN PACIFIC.—An officer writes that contracts have been let to build 59 miles of the Oregon Eastern, projected from Natron, Ore., south to Klamath Falls, 152 miles, as follows: For the grading, masonry and tunneling from Klamath Falls, north, on 25 miles, to Erickson & Petterson, San Francisco, Cal.; from Natron, south, on 34 miles, to the Utah Construction Co., of Ogden, Utah. A sub-contract is said to have been given by the Utah Construction Co. to the McCabe Company, of Portland, Ore., for grading about four miles and piercing a tunnel of 2,000 ft. and another 600 ft. (Aug. 13, p. 298.)

TENNESSEE RAILROAD.—Incorporated in Tennessee to develop about 5,000 acres of hard coal lands, the property of the Tennessee River Coal Co. This is to be accomplished by building a line in Marion county, Tenn., down Kings Cove to the Southern Railway and the Nashville, Chattanooga & St. Louis at Copenhagen, thence to the Tennessee river, about eight miles. A. Conover, president; I. W. Crabtree, secretary, both of Winchester; G. H. Crozier will be the engineer in charge of the construction and is also the general manager and superintendent of the mines; Louis Earle, of New York, is president of the coal company; E. C. Kerr, secretary, and R. F. Kilpatrick, general manager.

TEXAS ROADS.—An officer of the Provident Railway Right-of-way Co., of Provident City, Tex., writes that a charter has been granted and surveys are now being made for a line to be about 55 miles long, which is eventually to be extended to have a total of 131 miles. The proposed route is from a point in Wharton county, north via El Campo, to Glen Flora, and thence west via Hallettsville, traversing Wharton, Colorado and Lavaca counties. Carey Shaw, of Houston, president, associated with Kansas City capitalists, is back of the project.

The Quanah Chamber of Commerce, of which P. A. Whaley is secretary, is said to be back of a project to build from Woodward, Okla., south via Mangum and Quanah to Graham, Tex., 225 miles, where connection is to be made with the Chicago, Rock Island & Gulf.

Residents of San Antonio, Tex., and Fredericksburg are back of a project to build a line from Brady, Tex., southeast via Fredericksburg to San Antonio, about 130 miles. B. F. Yokum, of the Rock Island-Frisco lines, is interested. (July 16, p. 126.)

UTICA SOUTHERN.—Organized to build from Utica, N. Y., southwest to Hamilton, about 30 miles. Application was recently made to the New York Public Service Commission, Second district, for authority to build 24 miles additional beyond Hamilton south to Norwich, and to issue bonds to raise funds to carry out the work. A hearing is to be granted the company before the commission on September 1. Geo. W. Sanborn, president, and E. H. Risley, secretary, National Bank building, Utica.

Railroad Financial News.

BOSTON & MAINE.—See Boston Holding Co.

BOSTON HOLDING COMPANY.—This company has asked the Massachusetts Railroad Commission for permission to increase its capital stock from \$100,000 to \$1,749,200. This increase is for the purpose of buying the stock of the Boston & Maine, now held by John L. Billard.

CHICAGO GREAT WESTERN.—This road was sold at foreclosure at St. Paul, Minn., on August 21 for \$12,000,000 to a syndicate headed by J. P. Morgan & Co. The next step in carrying out the plan of reorganization (June 18, page 1330) will be the turning over of the property to the newly incorporated Chicago Great Western Railroad.

CINCINNATI, HAMILTON & DAYTON.—The plan of readjustment having become effective, the first and refunding mortgage for \$75,000,000 and the general mortgage for \$20,000,000 have been filed and bonds are being issued under these mortgages in accordance with the plan of readjustment published in the *Railroad Age Gazette* of June 4, page 1188. The details of the plan, including the guarantee by the Baltimore & Ohio of the purchase money 4 per cent. notes, are being carried out.

CINCINNATI, INDIANAPOLIS & WESTERN.—The protective committee, William A. Reed, chairman, having collected the amount due on coupons payable July 1, 1908, and July 1, 1909, on the first and refunding mortgage 4 per cent. bonds and on the Indianapolis, Decatur & Western 5 per cent. bonds, together with interest at 6 per cent. on the overdue interest, will, on surrender of certificates of deposit, return to the owners their bonds and the interest collected on them. See Cincinnati, Hamilton & Dayton.

COPPER RIVER & NORTH WESTERN (ALASKA).—This company has filed a mortgage to secure \$50,000 5 per cent. 50-year bonds. The company has an authorized capital stock of \$5,000,000 and operates a line running inland from Cordova, Alaska, 80 miles. It is expected that 200 miles of line will be in operation in a little over a year. It is understood by the *Commercial & Financial Chronicle*, New York, that the road is controlled by J. P. Morgan & Co. and the American Smelting & Refining Co. interests.

DUBUQUE & SIOUX CITY.—A dividend of 3½ per cent. for the year ended June 30 has been declared payable August 18 on the \$15,000,000 stock. In 1908 1½ per cent. was paid and in 1907 4 per cent. Nearly all of the stock is owned by the Illinois Central.

IDaho & WASHINGTON NORTHERN.—Peabody, Houghteling & Co., Chicago, are offering the unsold portion of the present issue of \$3,090,000 first mortgage 5 per cent. sinking fund bonds of 1907-1932, at 95, to yield about 5¾ per cent. The company operates a road running from Spokane, Wash., to Newport. The mortgage is secured on 103 miles of main line, 51 miles of which are in operation and 52 miles under construction, and further secured on the rolling stock and terminals.

INTERBOROUGH RAPID TRANSIT.—The outstanding \$10,000,000 three-year 5 per cent. notes dated March 1, 1907, have been called for redemption on September 1 at 101.

LONG ISLAND.—The New York Public Service Commission, Second district, has received an application from the Long Island asking for authority to issue debentures not to exceed \$16,500,000. The proceeds of the bonds are to be used to repay the Pennsylvania \$6,032,951 loaned by that company and expended for various improvements during the years 1905 to 1908 inclusive. The company says that it will require within the next three years additional capital for work and for equipment necessary to continue the improvements which have been commenced. The Pennsylvania is willing to make further loans in addition to its existing indebtedness of \$6,032,951 of \$10,500,000, loans to be secured by the issue of 10-year 4 per cent. debentures and in such years that interest thereon cannot be paid by petitioner out of earnings authority is asked for permission to issue

non-interest bearing debenture script convertible into debentures to be issued therefor; such debenture to be payable in cash or redeemed by the issue of some more permanent form of security when the financial condition of the company and its increased earnings justify. See this company under Railroad Construction.

MANISTIQUE & NORTHERN.—See Manistique & Lake Superior.

MANISTIQUE & LAKE SUPERIOR.—This company, incorporated in Michigan in July with a capital stock of \$250,000 and an authorized issue of \$1,300,000 twenty-five-year non-cumulative income bonds, of which \$1,100,000 are outstanding, has bought the property of the Manistique & Northern, which includes a line running from Manistique, Mich., on Lake Michigan, to Shingleton, on the Duluth, South Shore & Atlantic, 40 miles. The M. & N. is a recent reorganization of the Manistique, Marquette & Northern, which company was controlled through ownership of a majority of the stock by the Grand Rapids & Indiana. The Manistique & Lake Superior is controlled by the same interests as the Ann Arbor.

METROPOLITAN STREET RAILWAY.—The committee representing the general collateral trust 5 per cent. first mortgage bonds, of which there are \$12,500,000 outstanding, and the refunding 4 per cent. second mortgage bonds, of which there are \$60,604,000 outstanding, some time ago employed Stone & Webster to make a physical valuation of the Metropolitan Street Railway property and a New York paper says that they now recommend some form of partnership between the Metropolitan Street Railway and New York City and also joint operation of the property. There is in Chicago such a joint operation of street railways.

MICHIGAN CENTRAL.—A new mortgage on the property of the Grand River Valley, securing an authorized issue of \$4,500,000 4 per cent. bonds of September 1, 1909-1959, has been made. Bonds to an amount necessary to reimburse the Michigan Central for a payment to be made September 1 of \$1,500,000 to take up the \$1,500,000 6 per cent. bonds of the Grand River Valley maturing on that date will be issued in the future.

MOBILE, JACKSON & KANSAS CITY.—This road was sold at foreclosure sale at Decatur, Newton county, Mississippi, on August 23. The purchase price was \$3,200,000, and Neil A. Weathers was bidder. It is understood that the road was bought in the interest of the bondholders and that its name will be changed to the New Orleans, Mobile & Chicago.

NEW ORLEANS RAILWAY & LIGHT.—Bertrom, Griscom & Jenks, New York, have bought \$2,580,900 5 per cent. bonds of 1909-1949 and have placed the entire amount of bonds with a French syndicate, headed by the French Finance Corporation. The total authorized issue of bonds is \$50,000,000, of which \$30,000,000 are to be reserved to retire general mortgage 4½ per cent. bonds now outstanding. Of the balance, \$1,580,900 will be used to pay off on November 1, 1909, an issue of outstanding 6 per cent. notes.

PENNSYLVANIA.—See Long Island.

POTOMAC, FREDERICKSBURG & PIEDMONT.—This company has filed a mortgage securing \$750,000 first mortgage 40-year bonds, of which \$450,000 are to be used to refund maturing bonds and to make improvements and buy new equipment. The remaining bonds will only be issued after a vote of the stockholders.

ST. LOUIS & SAN FRANCISCO.—A press despatch dated New Orleans says that trains of the St. Louis & San Francisco will be run into the city of New Orleans over the tracks of the Louisiana Railway & Navigation Co. beginning September 1. The Frisco is to get into New Orleans over its own tracks eventually.

SEABOARD AIR LINE.—Stockholders have voted to approve the plan of reorganization, as outlined in the *Railroad Age Gazette* of July 9, page 81, and to approve the issue of bonds as proposed in that plan. The time for deposit of first mortgage 4 per cent. bonds and general mortgage 5 per cent. bonds under the plan has been extended to September 4.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Illinois Central has ordered 10 consolidation engines from the Baldwin Locomotive Works.

The Chicago, Rock Island & Pacific has ordered 50 locomotives from the American Locomotive Co.

The Norfolk & Western is figuring on six Pacific locomotives somewhat heavier than those now in service on the road.

Fitchugh & Company, Auburn, Cal., have ordered two saddle tank locomotives from the Vulcan Iron Works, Wilkesbarre, Pa.

The City of Los Angeles has ordered from the Vulcan Iron Works, Wilkesbarre, Pa., a special 12-in. x 18-in. saddle tank locomotive.

The Grand Trunk has ordered 25 locomotives from the Canadian Locomotive Works, 15 from the Canada Foundry Co. and 10 from its own shops.

The St. Louis & San Francisco has ordered 15 consolidation locomotives from the Baldwin Locomotive Works. These locomotives are in addition to those mentioned in the Railroad Age Gazette of July 16.

The Nevada Northern has ordered one switch engine and will order one heavy consolidation locomotive. A contract for locomotive repairs has been made with the Western Machine & Foundry Co., Ogden, Utah.

The Central of Hayti, as reported in the Railroad Age Gazette of August 20, has ordered four simple 0-4-2 side tank locomotives and one 0-4-0 side tank locomotive from the H. K. Porter Co. These engines are 30-in. gage. The dimensions are as follows:

Type of locomotive.....	0-4-2	0-4-0
Weight on drivers.....	52,000 lbs.	38,000 lbs.
Total weight.....	60,000 lbs.	38,000 lbs.
Cylinders.....	13 in. x 18 in.	10 in. x 16 in.
Diameter of drivers.....	40 in.	30 in.
Type of boiler.....	Straight.	Straight.
Working steam pressure..	170 lbs.	160 lbs.
Heating surface, tubes..	571.1 sq. ft.	330.6 sq. ft.
" firebox.....	58.9	40.1
" total.....	630	370.7
Tubes, number.....	112	72
" outside diameter..	2 in.	2 in.
" length.....	10 ft.	8 ft. 10 in.
Firebox, length.....	50 in.	40 in.
Firebox, width.....	38 in.	33½ in.
Grate area.....	13.2 sq. ft.	9.2 sq. ft.
Tank capacity for water..	1,000 gals.	650 gals.
Coal capacity.....	300 cu. ft.	30 cu. ft.

The Great Northern has ordered, as previously reported in the Railroad Age Gazette, 25 simple, 10-wheel passenger locomotives and 10 Mallet compounds from the Baldwin Locomotive Works. All are to be equipped with superheaters and the 10 Mallets have feed water heaters. The general dimensions of the 25 passenger engines are:

Weight on drivers.....	150,000 lbs.
Total weight.....	190,000 "
Cylinders.....	26 in. x 30 in.
Diameter of drivers.....	73 in.
Type of boiler.....	Belpaire
Working steam pressure.....	150 lbs.
Tubes.....	205
" outside diameter.....	2¼ in. and 5 in.
" length.....	16 ft. 6 in.
Firebox, type.....	Wide
" length.....	108 in.
" width.....	66¾
Tank capacity for water.....	8,000 gals.
Coal capacity.....	12 tons

The 10 Mallets weigh 315,000 lbs. on the drivers and have a total weight of 355,000 lbs. The cylinders are 21 in. x 30 in. and 33 in. x 30 in., the drivers 55 in. in diameter, the boiler, Belpaire, and the working steam pressure 200 lbs.

CAR BUILDING.

The Great Northern is in the market for 500 to 1,000 ore cars.

The St. Louis & San Francisco is in the market for gondola cars.

The New York, Ontario & Western is figuring on building 500 hopper gondola, steel underframe, 40-ton, coal cars.

The Nevada Northern has made a contract with the Western Machine & Foundry Co., Ogden, Utah, for car repairs.

The Beckford Sand & Gravel Co., Hampton, Va., is said to be in the market for flat and dump cars. This is not yet confirmed.

The Erie will soon be in the market for 100 furniture cars. No further freight equipment is now under consideration and action has been postponed on the 100 passenger cars mentioned in the Railroad Age Gazette of June 25.

The Chicago & North Western has ordered from the Pullman Co. 125 all-steel passenger cars as follows: Forty coaches, 20 reclining chair, 15 smoker, 12 parlor, 5 dining, 16 postal and 17 baggage cars. This is the first order placed by the Chicago & North Western for steel passenger equipment, and the new cars, when finished, will materially raise the standard of the through train service. This order includes the 96 cars mentioned in the Railroad Age Gazette of June 18.

The Missouri, Oklahoma & Gulf has ordered 50 all-wood, 40-ton box cars from the Barney & Smith Car Co. They are to be 36 ft. long, 8 ft. 6 in. wide and 8 ft. high. The car building company is to furnish the specialties that do not appear below:

Brakes.....	Westinghouse
Couplers.....	Climax
Door fastenings.....	Dayton
Draft gear.....	Miner tandem
Paint.....	Prince's Universal
Springs.....	M. C. B. Class C—Ry. Steel-Spring Co.

IRON AND STEEL.

The Harriman Lines are in the market for 15,000 tons of tie plates.

The Baltimore & Ohio is in the market for 4,000 kegs of standard spikes.

The Chicago, Burlington & Quincy has ordered 1,400 tons of bridge steel for miscellaneous structures.

The Pullman Company has ordered 10,000 tons of structural steel from the Kenwood Bridge Co. for use in new shops.

The Chicago, Milwaukee & St. Paul has ordered 250 tons of structural steel for a 284-ft. viaduct at Russel Creek, Iowa.

The Chicago, Burlington & Quincy is said to have ordered 5,000 tons of ferro-titanium rails from the Lackawanna Steel Co.

The North Jersey Construction Co. has ordered 2,000 tons of standard rails for the electric line between Suffern, N. J., and Paterson.

The Chicago & North Western is figuring on 4,000 tons of steel for the approaches to its new Chicago station in addition to the 40,000 tons already ordered.

The Atchison, Topeka & Santa Fe has ordered 130,000 tons of rails. The order was divided between the Illinois Steel Co. and the Colorado Fuel & Iron Co., the majority of the tonnage being placed with the former company.

General Conditions in Steel.—The steel companies are finding difficulty in getting cars with which to make shipments, and are one or two months behind in their deliveries. The demand for steel billets is the largest since October, 1907, and deliveries are far behind. The iron market has strengthened. The Cambria Steel Co. has announced an advance in the price of steel bars, bringing it up to the figures which obtained when prices were cut last February.

RAILROAD STRUCTURES.

AROOSTROOK JUNCTION, N. B.—An officer of the Canadian Pacific writes that contracts have been given to J. H. Hague for putting up a six-stall concrete and steel roundhouse, to cost \$20,000; four cottages, to cost \$6,600, and a steel turntable, with concrete pit and piers, to cost \$7,000. Contract

also let to Post Henery for a boarding house, to cost \$10,000. (Aug. 13, p. 300.)

BELLE PLAINE, IOWA.—The Chicago & North Western has finished a large water tank and it is said will put up a large car repair shop.

BELLINGHAM, WASH.—According to local press reports the Northern Pacific officers say that a large freight warehouse and additional team tracks will be built at Bellingham.

BERLIN, WIS.—The Chicago, Milwaukee & St. Paul, it is said, will put up a combined freight and passenger station to replace the structure destroyed by fire.

CHICAGO.—See item under General News in reference to new office building for the Chicago, Rock Island & Pacific.

COLUMBUS, OHIO.—The Cleveland, Cincinnati, Chicago & St. Louis has given a contract to W. C. Carr & Son, of Crawfordsville, Ind., for putting up a brick and timber freight house one-story high, 140 ft. x 670 ft., at Columbus, to cost \$60,000.

DAYTON, OHIO.—The Peoples Railway Co. has issued a call for plans and specifications for a car house to cost about \$250,000.

DU BOIS, PA.—An officer of the Buffalo, Rochester & Pittsburgh writes that bids are being asked for the construction of a division office building. The structure is to be three stories high, constructed of pressed brick with lime-stone and terra cotta trimmings.

DUHAMEL, ALB.—The Grand Trunk Pacific is said to be making plans for a steel bridge with concrete abutments, to be 3,000 ft. long and 100 ft. high.

DULUTH, MINN.—Contract is said to have been given by the Minneapolis, St. Paul & Sault Ste. Marie to George H. Lounsbury for putting up a passenger station, to cost \$50,000, at Sixth avenue and Superior street. An additional contract for interior work to cost about the same amount is to be let later.

EDMONTON, ALB.—Contract is said to be let to Charles May, of Edmonton, by the Grand Trunk Pacific, for building a bridge over the McLeod river, to cost \$275,000.

HIGH BRIDGE, KY.—Contract is said to have been let to Oliver Brothers & Hunnicott, of Knoxville, Tenn., to remove 200,000 cu. yds. of earth preparatory to the construction of a new bridge over the Kentucky river by the Cincinnati, New Orleans & Texas Pacific. The bridge is to be 306 ft. above low water.

INDIANAPOLIS, IND.—The Indianapolis Traction & Terminal Co. has prepared plans for a \$15,000 paint shop on Washington street to replace the one destroyed by fire. The building is to be 104 ft. x 140 ft., one-story high, with brick walls and steel roof. (June 18, p. 1333.)

JONESBORO, ARK.—The St. Louis & San Francisco is planning to build a brick roundhouse and an office building.

MACON, GA.—The Central of Georgia has let contracts for building wood working and blacksmith shops to cost \$75,000, and plans are under way for putting up boiler and tank shops.

MARION, ARK.—See St. Louis & San Francisco, under Railroad Construction.

MARSHALLTOWN, IOWA.—Fire in the Iowa Central's roundhouse on August 7 destroyed five stalls and damaged four engines.

MARSHFIELD, WIS.—The Chicago & North Western, it is said, is putting up a new passenger station and elevated coal sheds at Marshfield. The improvements will cost about \$50,000.

MERIDIAN, MISS.—Work is said to be under way on a 44-stall roundhouse for the New Orleans & Northeastern, to cost \$150,000. The foundations are to be of concrete and cost \$30,000.

NELSON, B. C.—The repair shops of the Canadian Pacific were damaged by fire on August 6, with a loss of about \$10,000.

OROVILLE, CAL.—Contract is said to have been given by the Western Pacific to F. W. Morris, of Oakland, Cal., for putting up a new passenger station at Oroville. The same contractor is putting up 10 section houses between Oroville and Quincy, also a new freight house in Oroville.

PERKIOMEN JUNCTION, PA.—An officer of the Perkiomen Rail-

road writes that contracts have been let for putting up bridges on the road as follows: North of Spring Mount, three 105-ft. deck plate girders; south of Palm, a 63-ft. through plate girder, and four 54-ft. deck plate girder spans. The contracts for the substructures have been let to the John A. Kelley Co. and for the steel superstructures to the Phoenix Bridge Co. Nine deck plate girder bridges are to be put up between Perkiomen Junction and Green Lane, aggregating 19 spans, ranging from 45 ft. to 83 ft. each. Contracts for the substructures let to the John A. Kelley Co. and for the steel superstructures to the McClintic-Marshall Co. (Aug. 20, p. 344.)

PLYMOUTH, N. H.—An officer of the Boston & Maine writes that contract has been given to the C. B. Hutchinson Building Co., of Concord, N. H., and work is to be started at once on a brick and brown stone passenger station at Plymouth. The new station is to be one-story-and-a-half high, 47 ft. x 194 ft., and is to cost about \$150,000. (Aug. 20, p. 344.)

PORT ARTHUR, ONT.—Contract is said to have been let to the Imperial Construction Co., of Toronto, Ont., at \$260,000, for putting up a hotel for the Canadian Northern.

SHERMAN, TEX.—A contract has been let for building a union passenger station to cost \$82,000.

SOMERVILLE, TEX.—Contract is said to have been given by the Gulf, Colorado & Santa Fe to H. D. McCoy, of Cleburne, for putting up a large engine house at Somerville, to cost about \$30,000. Additional tracks yet to be laid will bring the total cost for the improvements up to \$50,000.

TAYLOR, TEX.—A contract is said to have been given by the International & Great Northern to J. W. Thompson, of St. Louis, Mo., for putting up new shops and a roundhouse at Taylor, on which work is to be started at once. The cost of the improvements will be about \$45,000. Work has already been started dredging and damming the Flag Springs lake, from which water is to be pumped to the new Taylor shops. (Aug. 20, p. 339.)

VENICE, ILL.—The Illinois Traction System is planning to build a power house of 10,000 h.p. capacity, to cost \$500,000.

VERNON, TEX.—The Fort Worth & Denver City, it is reported, will build a station.

WICHITA, KAN.—Local press reports indicate that the Kansas City, Mexico & Orient will begin work this fall on the general shops for its system.

WINNIPEG, MAN.—Contract is said to be let to Smith Brothers & Wilson, of Regina, Sask., for putting up 41 stations at various points on the Grand Trunk Pacific between Winnipeg, Man., and Edmonton, Alb., to cost between \$5,000 and \$10,000 each.

SIGNALING.

It is understood that officers of the Denver & Rio Grande have under consideration the installation of automatic block signals upon the main line.

FOREIGN RAILWAY NOTES.

The Buenos Ayres Great Southern has made plans for building 58 miles of road from General Alvear to Carhue and Pigue.

A concession has been given to Eduardo Germain for building a railway in Chili from Curico to Hualane at a cost of about \$900,000.

The famous Borsig Locomotive Works of Berlin recently finished its 7,000th locomotive, a four-cylinder compound, destined for Algiers. It was also the 100th engine built on a French order.

Plans have been submitted by the Leopoldina Railway for building from Alegre, on the Caravellas Railway, in the state of Santo Spirito, Brazil, to Manhuassu, in the state of Minas Geraes. The cost is estimated at \$3,300,000.

Supply Trade News.

The Isthmian Canal Commission is asking bids up to August 31 on long leaf yellow pine or Douglas fir lumber. (Circular No. 532.)

L. H. Raymond, formerly master mechanic on the New York Central, has become Eastern representative of the Grip Nut Co., Chicago and New York.

The Crocker-Wheeler Co., Ampere, N. J., will open an office in the Ford building, Detroit, Mich., on or about September 10. Charles W. Cross will be the manager of this branch.

The Nevada Northern will ask bids about December 1 for the following individual drive machine tools: One punch and shear, one 12-in. slotter, one set of rolls, one 10-ton crane and one bolt machine.

Erickson & Petterson, San Francisco, Cal., recently ordered six 11-in. x 16-in. four-driver saddle tank locomotives equipped for oil burning from the Vulcan Iron Works, Wilkesbarre, Pa. Two of these locomotives have already been delivered.

During the business depression the American Locomotive Co., New York, made contracts for extensive improvements to the shops at Schenectady, Dunkirk, Richmond and Pittsburgh, to cost about \$3,500,000. To reimburse the company for money spent and to be spent on these improvements, and to provide additional working capital which will be needed because of the increased capacity, a \$5,000,000 note issue has been authorized.

The Crocker-Wheeler Co., Ampere, N. J., recently booked several large orders for direct current apparatus. One from the Indiana Steel Co. calls for 70 mill motors, totaling about 2,400 h. p. This order is an addition to the 11,000 h. p. of Crocker-Wheeler motors, employed at present by this company. The King Bridge Co., Cleveland, Ohio, recently placed an order for one 150 kw., compound-wound, 250-volt generator, to be used for supplying light and power. The Bethlehem Steel Co. recently added to its 8,800 h. p. of Crocker-Wheeler motors by an order for a 225 h. p. compound-wound motor, to be installed at the Saucon plant.

The Association of Car Lighting Supply Manufacturers was organized at a recent meeting in Chicago to furnish entertainment and to give exhibitions of car lighting supplies in connection with the meetings of the Association of Car Lighting Engineers, whose next meeting will be held at the La Salle hotel in Chicago, on October 4, 5, 6 and 7. The following officers of the Association of Car Lighting Supply Manufacturers have been elected: President, W. L. Bliss, United States Light & Heating Co.; eastern vice-president, C. W. Bender, National Electric Lamp Association; western vice-president, W. E. Ballentine, Willard Storage Battery Co.; secretary, J. Scribner, General Electric Co.; treasurer, Edward Wray, *Railway Electric Engineer*. A committee on arrangements has been appointed, of which J. M. Schilling, of the Westinghouse Electric & Manufacturing Co., is chairman. A committee on dues and finances has been appointed, of which Charles Talbott, of the Westinghouse Electric & Manufacturing Co., is chairman. A committee on membership has been appointed, of which Edward Wray is chairman. The membership fee for companies is \$25 and for individuals, \$5. The Association of Car Lighting Engineers is composed of officers of the railways having charge of car lighting and also of representatives of supply concerns. The latter will continue to belong to the Association of Car Lighting Engineers.

Captain Herman P. Schuyler, assistant treasurer of the General Electric Co., Schenectady, N. Y., died on August 14 at his home in Albany, N. Y. He was born in Albany county in 1842, and was a direct descendant of Gen. Philip Schuyler. With the beginning of the Civil War Mr. Schuyler went west and enlisted in the First Wisconsin Regiment, where he remained until the end of the war, being promoted to first lieutenant. In 1864 he was appointed head of the ordinance department of the army corps, with headquarters at the Watervliet arsenal. Resigning this position in 1870, he became the head of the sales department of the Troy Steel & Iron Co., Troy, N. Y. In 1887 Captain Schuyler went to New York to become private

secretary of the late H. H. Rogers, of the Standard Oil Co. Three years later he was called to Philadelphia to become head of the sales department of the Wellman Steel & Iron Co. at Thurlow, Pa. From this position his marked ability won for him the position of assistant treasurer, in charge of credits, of the General Electric Co., in 1893, which position he retained until the day of his death. He was especially well known in New York, Troy, Schenectady and Albany, being a member of the Fort Orange Club of Albany, Troy Club of Troy, and the Army and Navy Club, the Loyal Legion and the Holland Society of New York City. He is survived by a daughter, Mrs. R. C. Yates, and a son, Herman P. Schuyler, Jr., both of Chicago.

TRADE PUBLICATIONS.

Roofing.—The Barrett Manufacturing Co., New York, has published a pamphlet illustrated with a number of photographs of roundhouses covered with Barrett specification roofs.

Storage Batteries.—Bulletin No. 115 of the Electric Storage Battery Co., Philadelphia, Pa., describes with illustrations the installation of Chloride Accumulators in the Hudson Terminal buildings, New York.

Asbestos Roofing.—Catalogue No. 303 of the H. W. Johns-Manville Co., New York, contains 52 pages of illustrated description, with price lists, of J. M. asbestos roofing. Tests showing its fireproof qualities are included.

Recording Dynamometer.—The Ashton Valve Co., Boston, Mass., has published a pamphlet describing the Ashton locomotive recording dynamometer. This device is described elsewhere in the current issue of the *Railroad Age Gazette*.

Metallic Packing.—The Power Specialty Co., New York, is distributing a pamphlet describing Duval metallic packing, for which it is the sole agent and importer. This packing is made of white alloy wire, plaited so as to form a square cross section.

Ruberoid Roofing.—The Standard Paint Co., New York, is distributing samples of Ruberoid roofing laid on roofs of a factory 17 years ago. It was removed when it was decided to reconstruct the roof frames and boards. The Ruberoid itself was in excellent condition.

Forging Presses.—The United Engineering & Foundry Co., Pittsburgh, Pa., has published an illustrated pamphlet describing high-speed forging presses of the steam-hydraulic intensifier type, Davis Brothers, Ltd., patents. These are built for all classes of forging, shearing or pressing. They have single-lever control and are from 100 tons to 12,000 tons capacity.

Motor Cars.—Bulletin 134 of the Buda Foundry & Manufacturing Co., Chicago, describes motor velocipedes, section cars, section gang cars, bridge gang cars and power cars. Various types are illustrated and described. There is also an illustrated description of the Buda pressed steel wheel for service on cars of these classes. Price lists of the wheels are given.

Over the Scenic Highway in a Tourist Sleeping Car.—This is a booklet of 14 pages describing fully the service rendered by the Northern Pacific on its tourist sleeping cars. The information is arranged in question and answer form, covering all the queries which usually arise. There are seven pictures of the cars and tables of standard and tourist sleeping car rates between principal points.

The Chicago, Milwaukee & St. Paul.—A booklet entitled "Kilbourn and the Dells of the Wisconsin" is unique and deserving of especial praise. With the exception of a short introduction it consists of pictures, 35 full-page, colored half-tones being included.

The same company has issued a book on Colorado in which many short trips into the mountains are described.

Scenic Colorado.—The passenger department of the Burlington has published a book containing 72 pages and a large map insert on Colorado. Photographs are used throughout to illustrate the descriptions of the various resorts.

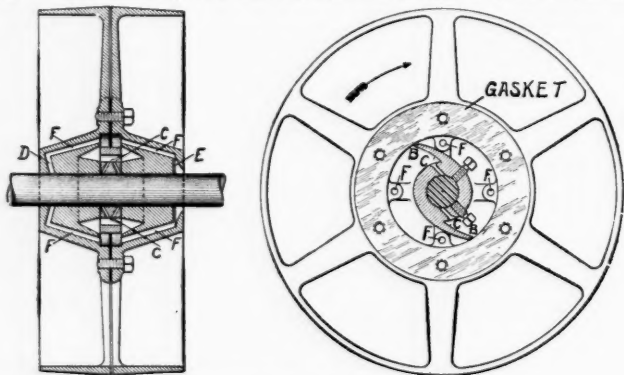
The same company has issued two small folders, one on Estes park in Colorado and the other a Colorado and Utah

handbook for pleasure seekers. The latter contains a list of hotels and boarding houses.

"The Gunnison Tunnel is Done."—This is the title of a pamphlet issued by the passenger department of the Denver & Rio Grande describing the fruit and farming land in the Uncompahgre valley, Colorado, which is to be irrigated by a system recently completed by the United States Reclamation Service. The valley includes about 150,000 acres which, although capable of raising fine fruit and field crops, has been semi-arid because the Uncompahgre is practically dry during the hot months. The irrigation system just completed is to utilize the waters of the Gunnison river, which flows parallel to the Uncompahgre through a deep granite gorge and serves no agricultural land. The Gunnison originates high enough in the mountains to insure a good flow of water at all seasons, and in ordinary conditions only a portion of the stream will need to be diverted to irrigate the entire valley. Since a high range separates the two rivers, a tunnel had to be driven to pass the water through. This is the Gunnison tunnel, which is 30,600 ft. long and 11 ft. x 13 ft. inside the concrete lining, driven the entire length through granite and limestone. The main distributing canal is 30 ft. wide at the bottom, 83 ft. wide at the top, carries an average depth of water of 10 ft. with a discharge of 1,300 cu. ft. per sec. The work has cost the government about \$5,000,000, to cover which perpetual water rights are to be sold at approximately \$35 per acre. As the water has a fall of 372 ft. after leaving the tunnel, a hydro-electric plant can be installed which will furnish enough current for light and power over the entire valley. The water is to be formally turned into the tunnel by President Taft on September 23.

The Maymont Self-Oiling Loose Pulley.

A new type of self-oiling loose pulley, the Maymont, is shown herewith. It is made in halves, with a combination set and oiling collar between. The hub is enlarged to enclose an oil reservoir, as shown in the open view. The halves are bolted together with a thin oil-proof gasket between, to prevent leakage. The oil-distributing collar is fixed to the shaft by two set screws, and serves, therefore, the sec-



Construction of Pulley.

ondary duty of a set collar, so no outside collar is needed. Clearance at the sides of the collar allows for necessary play sideways along the shaft.

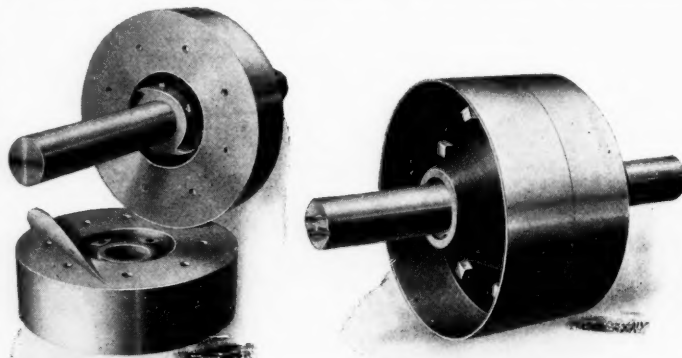
Referring to the drawing, it will be seen that the collar has two curved wings or lips (B B) extending outward nearly to the outer circle of the oil reservoir. Close inside these wings are drilled holes (C C) through the body of the collar, leading to the shaft at each side. Cored into the hubs at their outer ends are the recesses (D and E), the former closed and the latter open, as shown. Connecting these recesses with the central oil reservoir are four drilled ports (F F F F), diverging from the shaft. As the pulley rotates, these holes, at their reservoir ends, continually pass close to the wings of the fixed collar.

The operation is as follows: Oil in the reservoir, as the pulley rotates, is carried by the wings (B B) of the collar to and into the holes (C C) leading to the shaft. Here the oil passes directly onto the rubbing surfaces between the hub halves and the shaft. Working either way along the shaft, the oil reaches the end recesses (D and E), where centrifugal force carries it outward to the ports (F), and through them back to the reservoir. As the oil returns through all four ports (F), the wings (B B) of the collar collect it and direct it to the holes (C C). Thus a continuous circulation of the oil is automatically maintained and a copious lubrication of the pulley assured. At the same time, the pulley is automatically and naturally

non-leaking. The joint between the halves is made tight by a thin oil-proof gasket. The only other way out is along the shaft, and the centrifugal force cuts off escape of oil at each end at the recesses (D and E). Even when the pulley stops, the oil in ports (F) above the shaft will drain outward to recesses (D and E), and thence down around the shaft to the standing oil level.

New oil is fed in with the pulley in motion by inserting it at the open end (E) of the pulley, where it at once enters the circulation with the old oil. Addition of a very little oil once a month will usually maintain the supply, as none escapes.

Slight alterations in construction make the pulley suitable for vertical shafts or mule stands. It therefore is adapted to service in any position or at any angle from horizontal to vertical. It is claimed



Pulley in Halves.

Maymont Pulley.

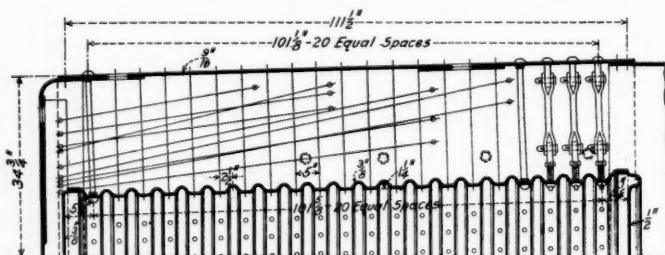
that in no case will it lose oil either in motion or at rest; also that by its positive and copious lubrication it will work well and run cool at highest speeds and under the strain of tightest belts; in fact, it is guaranteed for satisfactory operation under such conditions. Small diameters are made in web style like the half-tones, and the larger sizes have spokes, as in the line drawing. Every pulley is claimed to be perfectly balanced and will run true. The ample and reliable lubrication reduces wear to a minimum, and looseness on the shaft comes only after long periods of service. A sleeve may be used if desired, and then all wear on the shaft is prevented. The Maymont pulley is sold by the McMaster-Carr Supply Co., Chicago

Wood's Corrugated Firebox.

The accompanying cut shows part of an Atlantic Coast Line boiler, which has been changed over to suit patent firebox and tube plates of William H. Wood, Media, Pa.

There are a number of tubes blocked out, which cannot be utilized, but this is more than compensated by the extra heating surface in the box and on the tube plates.

The boilers arranged with these fireboxes and tube plates are claimed to be saving 20 per cent. in fuel alone, over those of the same class. The strains usually set up in a firebox are, in this case, neutralized, so that the steel forming the firebox can exert itself by expanding and



Wood's Firebox; Atlantic Coast Line.

contracting between each row of staybolts. On this account, it is claimed, there is no reason why fireboxes constructed in this form, with the reduction in stays, should not have the life extended indefinitely.

The last report received of washouts of these boilers during the last nine months' run is that no mud or scale adheres to the plates, the expansion and contraction being released between each staybolt. Any scale having a tendency to adhere to the plates cracks off as fast as formed.

The application of the Wood firebox to some New York Central engines was illustrated in the *Railroad Age Gazette* of Oct. 23, 1908, p. 1205, and results of their performance were reported in our issue of June 16, 1909, p. 1263.